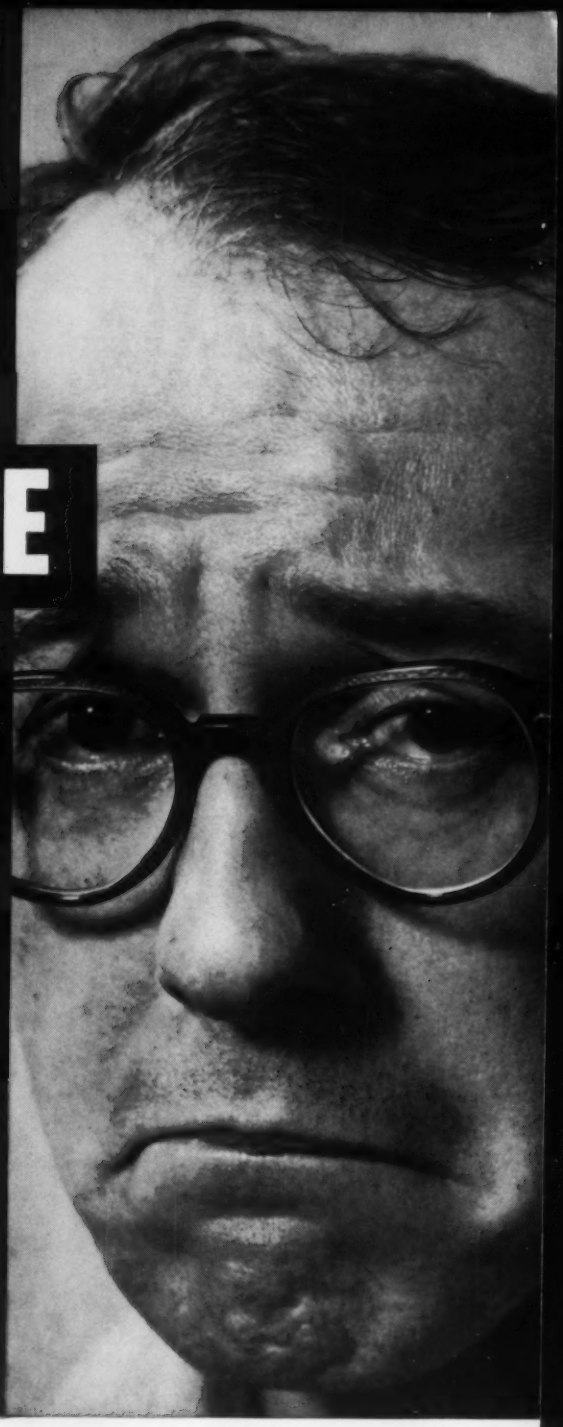
STEEL The Metalworking Weekly

MARCH 27, 1961

PROGRAM FOR MANAGEMENT

THE PRESSURE OF WAGES

Page 67



March Business Perks Optimism 71

How to Organize for Numerical Control 74

Neutrons Gage Foundry Sand Moisture 164

Low Sulfur Stainless Steel Patented 178

METALWORKING WEEK—PAGE 17
COMPLETE CONTENTS—PAGE 19

YOU REDUCE COST WITHOUT SACRIFICING QUALITY

when you specify B&W Lectrosonic J.I.C. Hydraulic Line Tubing

J.I.C. Standards for hydraulic fluid line applications now permit the use of welded or seamless steel tubing on an equivalent basis. B&W Lectrosonic® welded carbon steel tubing meets all such J.I.C. Standards—and has been proved by 6 years of rugged B&W field testing. What's more, B&W Lectrosonic tubing is produced under the most rigid quality control procedures in the industry. Tests are made before, during and after manufacture. The key phase: 100% ultrasonic inspection of the weld in line production. The result: superior electric-resistance welded tubing that does the job of seamless while it maintains the low cost advantages of welded.

See how B&W Lectrosonic tubing can meet your hydraulic line requirements. Just call your B&W District Sales Office or write for Bulletin T-435. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pennsylvania.

B&W

THE BABCOCK & WILCOX COMPANY

TUBULAR PRODUCTS DIVISION

TA-1009-M

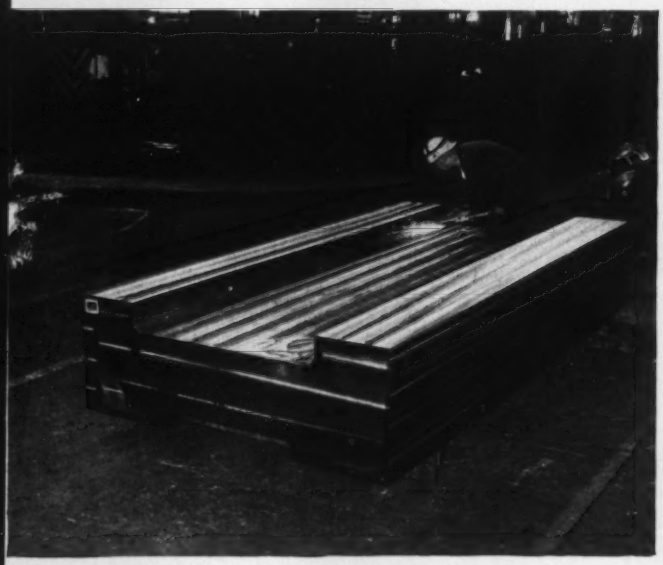
Seamless and welded tubular products, solid extrusions, seamless welding fittings and forged steel flanges—in carbon, alloy and stainless steels and special metals

You name it...we'll forge it!

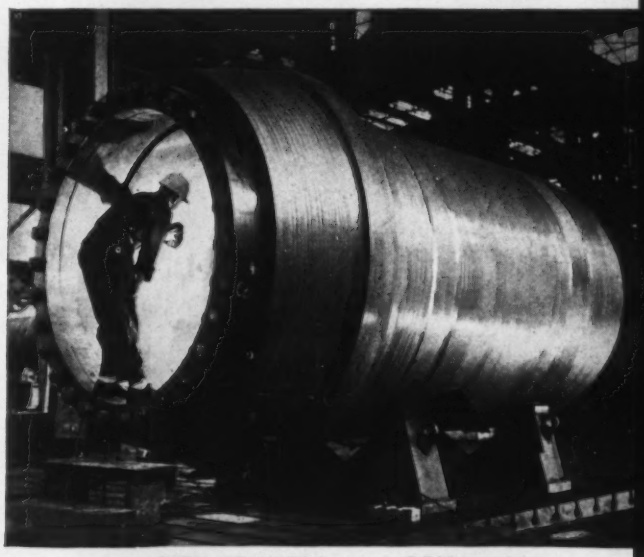
RIGHT ON THE NOSE. Bethlehem meets your specifications exactly on all types of press, drop, and hammer forgings.

Steel

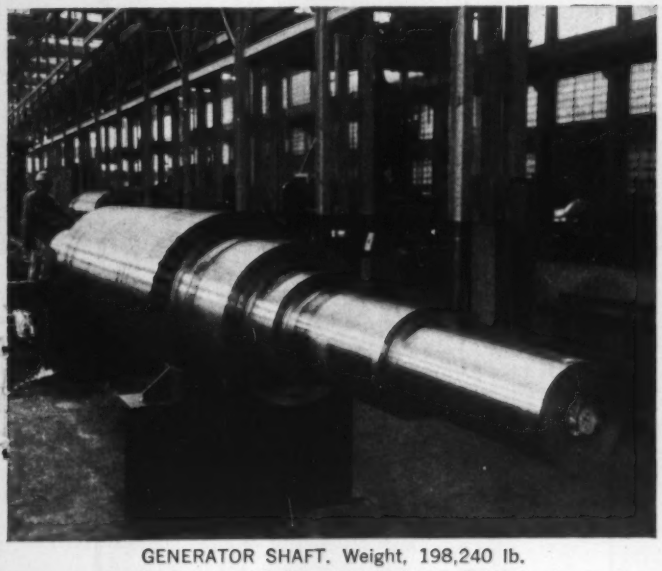
for Strength
... Economy
... Versatility



RAM ADAPTER. This forging weighs 58,780 lb, and measures 140 in. x 73 in. x 25 in.



STEEL CYLINDER for use in 7,500-ton plate stretcher. This forging weighs 171,240 lb, and it's 17 ft, 3 in. long.



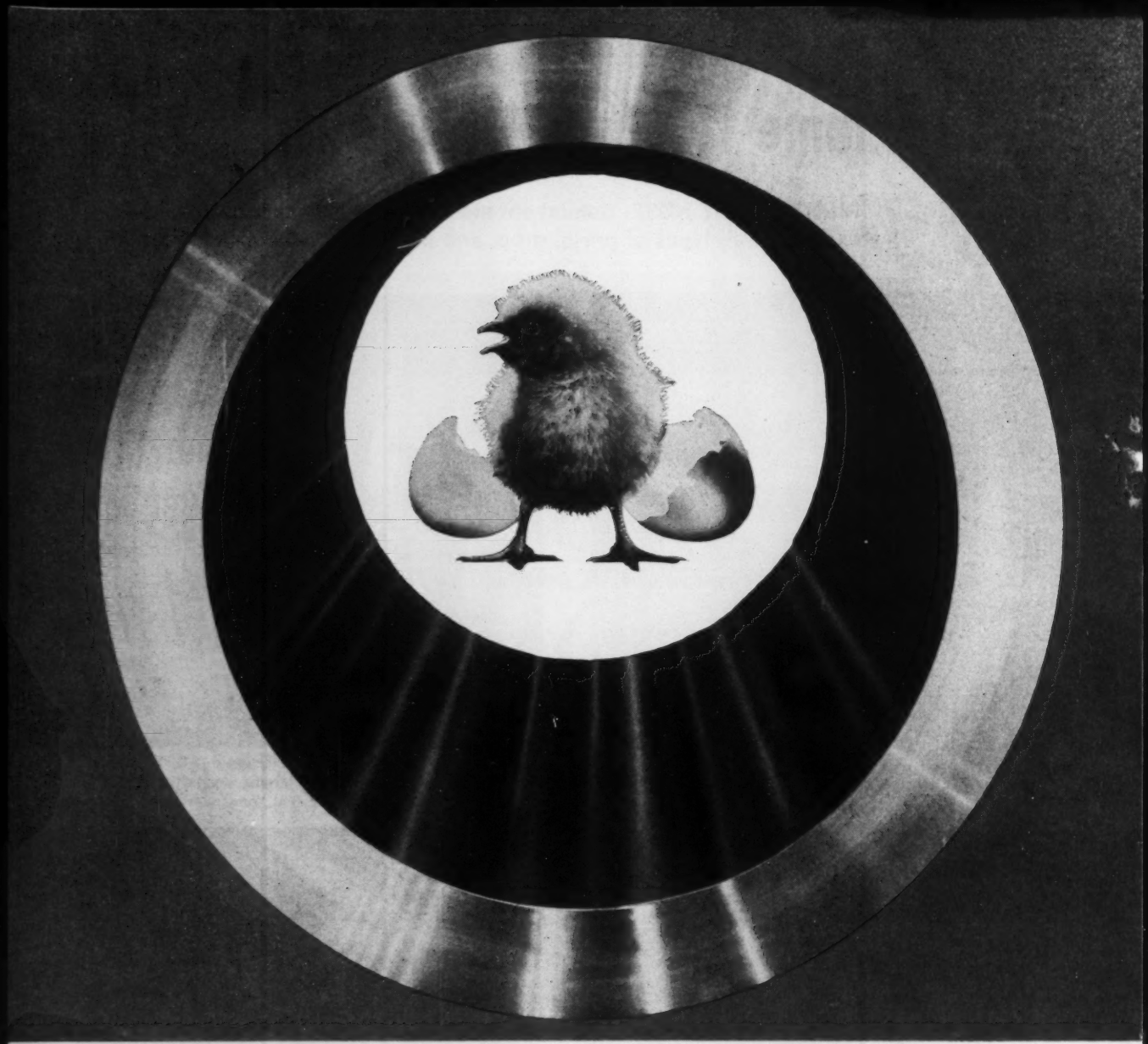
GENERATOR SHAFT. Weight, 198,240 lb. As you can tell from these photos, Bethlehem is well-equipped for machining.

REACTOR VESSEL CLOSURE. The OD of this 50,660-lb forging measures 12 ft.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA. *Export Sales:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL



WHAT'S NEW IN TUBING?

Here's another ACIPCO "first"... ACIPCO CERAM-SPUN®, the ceramic mold process* that offers greater versatility in design, new concepts in economy.

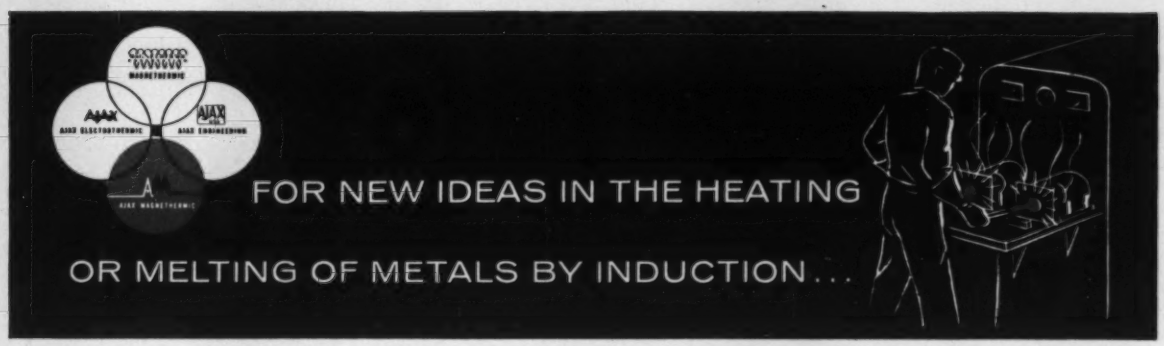
WHAT THESE ADVANTAGES MEAN TO YOU! ACIPCO is not limited by equipment sizes. Now, for the first time, you can order the exact tube O.D. you need... from 2.25" to 50". As-cast lengths can vary from 4 feet to 20 feet, longer lengths are made by welding; and wall thicknesses range from .25" to 8". Furthermore, these tubes can be furnished with the exact combination of physical, chemical, and metallurgical properties required by your specifications.

THE RESULT: YOU SAVE MORE! No more unnecessary metal waste or excessive machine charges.

Too, ACIPCO's complete "under one roof" operations — including heat treating, machining and welding — eliminate the delays and additional high costs often involved in buying from multiple sources. Before you order another steel tube . . . first investigate the many advantages ACIPCO offers. Contact ACIPCO STEEL PRODUCTS, Division of American Cast Iron Pipe Company, Birmingham 2, Alabama.

*Patent applied for

ACIPCO CERAM-SPUN®
STEEL TUBING



Equipment for heating steel bars for forging, one of many products of AM for the heating or melting of metals by Induction.

WATCH AM

AJAX Magnethermic CORPORATION

"induction heating is our only business"

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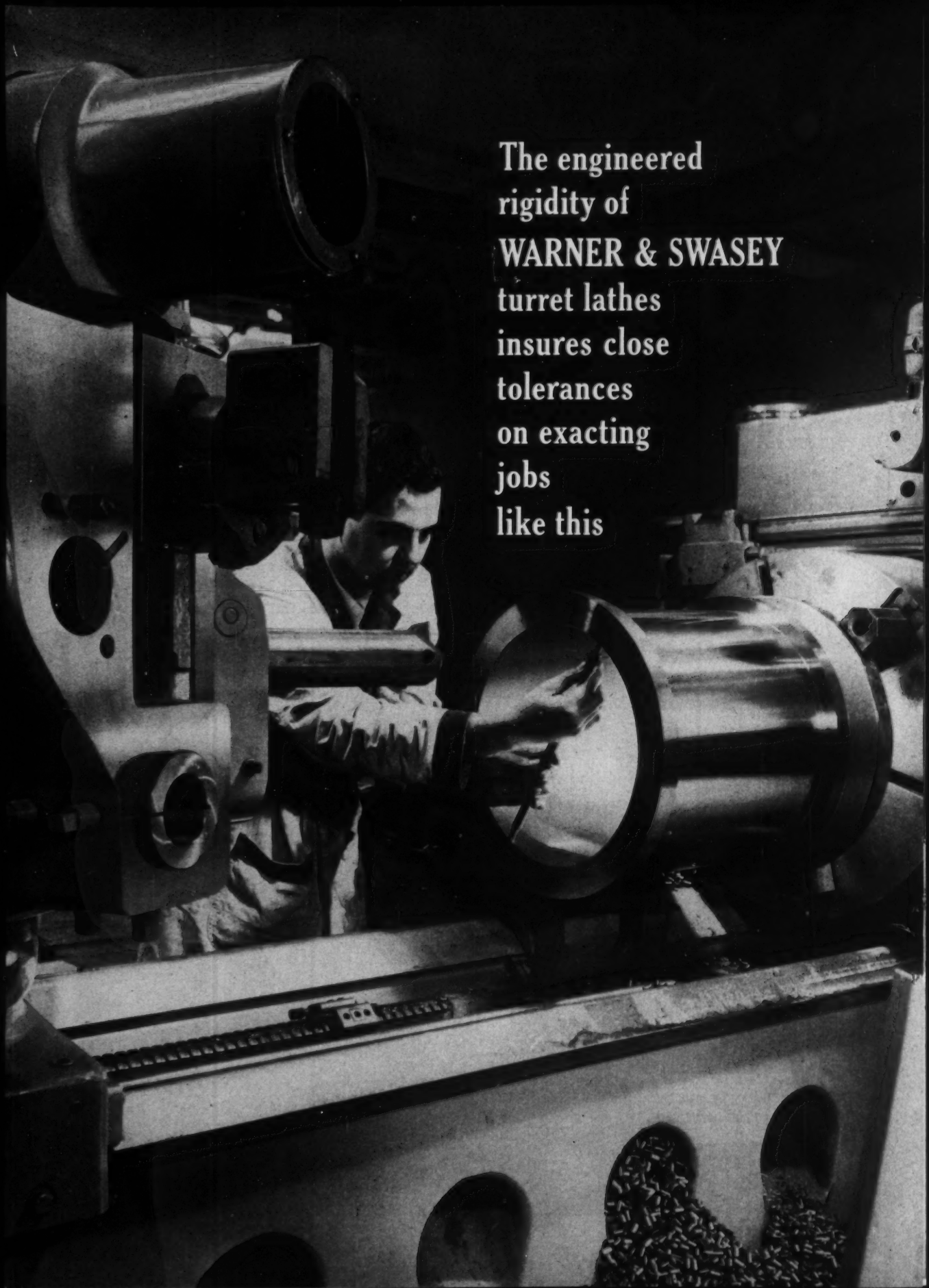
Automatic Heating by Induction for forging an automotive part.


The engineered
rigidity of
WARNER & SWASEY
turret lathes
insures close
tolerances
on exacting
jobs
like this

New Face

Perry J. Pascarella is the gentleman smiling at you over his typewriter. He's a new assistant editor on STEEL. He comes to us from Dun & Bradstreet Inc. where he was an analytical credit reporter. He'll be doing some analytical reporting for us, too, on economic subjects.

Perry was graduated from Kenyon College, Gambier, Ohio. He served three years four months in the Navy, leaving with a rank of lieutenant (jg).

Enunciate Carefully

The boys upstairs will have to enunciate clearly with the addition of Perry to the staff. We also have Derry (Assistant Editor Eynon) and Harry (Copy Editor Chandler).

To add to the potential confusion, we have three Williams (News Editor Dean, Market Editor Rooney, and Pittsburgh Editor Wallace), three Johns (Associate Managing Editor Morgan, Washington Editor Botzum, and Assistant Editor Teresko), two Roberts (Machine Tool Editor Huber and Associate Editor Jaynes), two Donalds (Detroit Editor Postma and Associate Editor Hammerstrom), and two Toms (Artists Welsh and Bryan).

Even that doesn't end it. We also have Associate Editor Brian Wilson, plus Chicago Editor Erle Ross, and Associate Editor Ross Whitehead—not to mention Metallurgical Editor Ed Case and yours truly, Ed Service.

Matrimonial Service

Never underestimate the power of the press. We were forcefully reminded of that by responses to a letter we ran Mar. 6 (second item, entitled "Good Supply") from a lady seeking a husband.

An excerpt from our favorite reply to date:

"If you will give me the dear lady reader's address, I will do my best to convince her that, among various other advantages, we can save the cost of one subscription to STEEL by consolidating."

Facts on "Facts & Figures"

STEEL's annual Facts & Figures section appears following Page 112. Until this year, the feature had been carried in our annual issue in early January. The editors are trying something different this time, holding it off until now to get full year figures for 1960. If it had been run in January, much data would have been incomplete.

Associate Editors Bob Jaynes and Frank Briggs and Associate Managing Editor Vance Bell put in more than 450 manhours on the job, which is the most complete, single-source compilation of metalworking data available anywhere. They used a ream and a half of copy paper, three rolls of adding machine tape, and two quarts of rubber cement to put together 350 tables from nearly 100 sources.

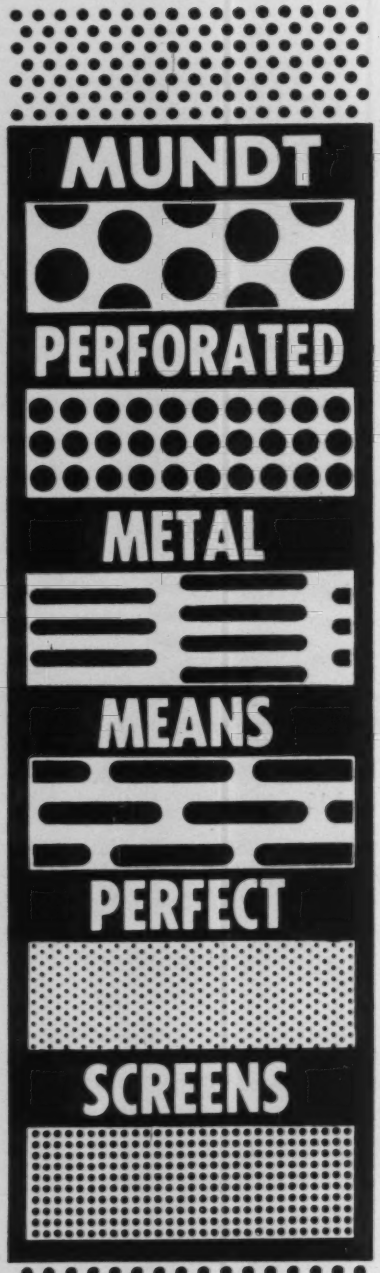
The section has statistics you can use whether you are in administration, marketing, production, engineering, or purchasing. Reprints are available at $1 each from Reprint Dept., STEEL, Penton Bldg., Cleveland 13, Ohio.

STEEL, in Capital Letters

"What's in a name?" William Shakespeare asked some centuries ago. Elmer J. Pohlman asked the same question recently. The director of purchases for Globe - Wernicke Co., Cincinnati, saw an ad urging him "to see your STEEL representative" for a Marketing Work File (pictured above). It's a black box measuring only 12 x 9 x 3¼ in., but it contains a wealth of data to help you in your marketing.

Mr. Pohlman skimmed over the capital letters in our name. His steel representative was Gary H. Kloriman of Armco Steel Corp. He asked him for the work file. Mr. Kloriman was puzzled but finally solved the mystery. Now both gentlemen have the work file. They're happy; we're happy. You will be too, if you see your STEEL representative.

STEEL, the metalworking weekly, is selectively distributed without charge to qualified management personnel with administrative, production, engineering, or purchasing functions in U. S. metalworking plants employing 20 or more. Those unable to qualify, or those wishing home delivered copies, may purchase copies at these rates: U. S. and possessions and Canada, $10 a year; all other countries, $30 a year; single copies, 50 cents. Metalworking Yearbook issue, $2. Published every Monday by The Penton Publishing Co., Penton Bldg., Cleveland 13, Ohio. Accepted as controlled circulation publication at Cleveland, Ohio.



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This ALL-NEW SUPER HIGH SPEED STEEL Band Saw Blade

comes welded-to-length . . . ready to use . . . in striking, new package with cutting edges protected by a special plastic cover.

Industry reports nothing else compares for cutoff production

The biggest advance ever in metal cutting band saw blades — that's Simonds *SUPER* High Speed Steel Metal Band Saw. No matter what ferrous metal you're band sawing, this brand new blade will give you *up to 3 times better performance* than any High Speed Steel blade you're now using!

This is not just a claim but a provable fact backed by Simonds' established reputation as a leading manufacturer of industrial cutting tools.

This *SUPER* High Speed Steel Band is an entirely new concept in band saws . . . new steel*, new manufacturing methods, new heat treatment, new welding techniques, new final inspection.

Laboratory and field tests demonstrate that this new saw is so much better in every way for production cut-off work that we are offering it on a PERFORMANCE GUARANTEED basis! You can't lose — you can cut your blade costs, save on down time, get the equivalent of up to 3 saws in better performance *at a cost of only 10% more than ordinary High Speed Steel blades.*

The sooner you try this new blade, the more you'll save! Get prompt delivery now of Simonds *SUPER* High Speed Steel Band through your Simonds Industrial Supply Distributor or your nearest Simonds Branch.

*Developed and made in Simonds own Steel Mill — Patent Applied For

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THE RIGHT HAND OF PRODUCTION

Your nearby SIMONDS DISTRIBUTOR is your most dependable cutting tool supply source. His stocks and services are designed with your convenience and economy in mind. Call him FIRST for all your industrial supply needs!

SIMONDS SAW AND STEEL CO.

FITCHBURG, MASSACHUSETTS

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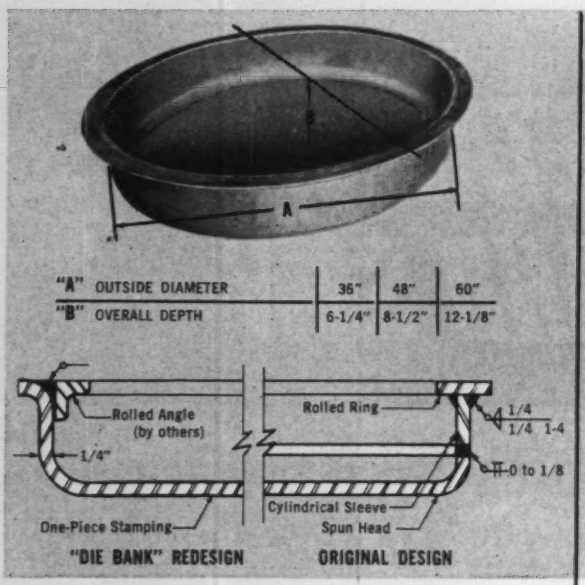
Superior Parts at Lowered Cost with This Fresh Approach to Stamping

Many parts in use today are better as a result of design refinements suggested by COMMERCIAL's stamping experts. The examples below demonstrate how these design refinements have resulted in superior parts for the OEM at lowered cost. These examples may appear to you as unusual in design and this is the point...

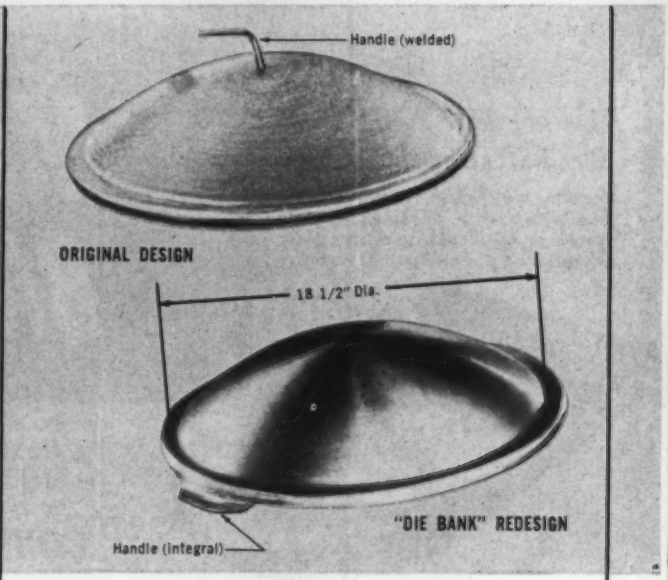


One Piece Stamping . . . Improves Appearance, Replaces Three Piece Weldment

Circular steel boiler doors 36", 48", 60" diameter were formerly fabricated from three basic components—spun head, cylindrical sleeve and ring rolled the hard way.

Problem: eliminate accumulative assembly variables caused by inherent non-uniformity of three components—upgrade product appearance.

Solution: one piece smooth surface COMMERCIAL steel stamping shaped in a die assembled from stock "die bank" components (for details of "die bank", see box upper right). Stamping tolerances plus or minus 1/16" (flat across flange within 1/16"). Result—accurate finished product because former difficult assembly and time-consuming fitting-up problems eliminated. All outside exposed welds (about 16 ft. on the 48 in. side) and grinding discontinued. An end product with improved appearance—better product appeal.



Stampings . . . Unitize Construction, Replace Inaccurate Stainless Steel Spinnings

Original contruction of bulk milk cooler used tank manhole cover spinning—requiring welding, grinding and polishing.

Problem: reduce production finishing time, overcome welding heat distortion of stressed metal-spinnings, increase strength, produce uniform parts and improve sanitation properties.

Solution: COMMERCIAL's "die bank" proved a nucleus for a one-piece stamping redesign including integral handles. Basic stamping details—size, shape and gauge were tailored to stock die components. Realization—smoother finish of stamping creates a more sanitary, better appearing tank. Closer tolerances of stamped cover provide flange with definite "drop-on" vacuum seal. Fewer parts resulting from stamping. Unitization greatly diminishes production time and component cost.

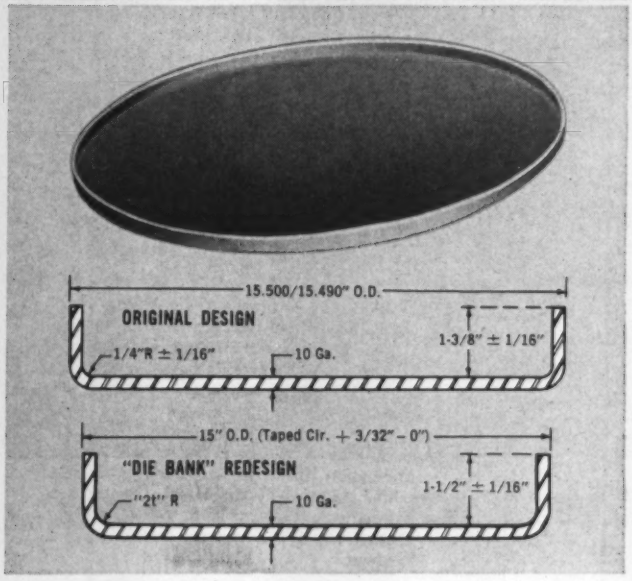
"Die Bank" Facts

Over 50,000 stock die components stand ready to go to work for you at COMMERCIAL. These components can be combined in endless variety—can prove, as they have for others, invaluable in your stamping design.

Components for circular stampings cover a diameter range from 2½" to 72". To 30" O.D., increments are in units of 1". Over 30" O.D., increments progress from 1" up to 6" for the largest diameter. Under 24" O.D., many sizes are available in fractional inches.

Stampings from these die components range from 20 gauge to ¾" thick. Contour can be flat or dished to any one of many patterns. Stampings can be supplied with vertical, horizontal or reverse flanges—or without any flange.

Use of COMMERCIAL's "die bank" results in many stampings made to basic original design free of heavy tooling cost—minor design latitude often eliminates all die expense. Catalog 200-C1 "Standard Metal Shapes" should be in your hands when preliminary designs go on the board.



"Die Bank" Stamping Gets O. K. . . .
Reduces Cost of Tailored Design

Original design of agriculture combine cylinder head called for odd fractional dimensions. Tolerances were tighter than necessary and applied in conflict with best stamping practice. Details were established without knowledge of COMMERCIAL's "die bank". Result—high unit cost to produce basic part to individually tailored size. Special dies, not in existence, were required.

Problem: redesign a more practical part to be mass produced at low unit-cost—eliminate special die cost.

Solution: simple redesign using stock die components from COMMERCIAL's "die bank" cancelled out $1850 partial die cost required for tooling original design. Net die cost: zero. Piece price reduced: 16 cents. Savings on initial requirement: over $2200. A stamping made to commonly accepted tolerances at lower cost without sacrificing product quality was the answer.

Advantages of Stampings

Economy of production
—metal conservation, waste material minimized, stamped parts have greater surface area than blank the part is made from—without loss in strength
—high quantity man-hour output from fast production machines—low unit cost

Greater strength: predicted, controlled, unvarying
—higher proportionately, in relation to weight, than possible in other metalworking processes

Enhanced appearance: finish is predictable, uniform, "as specified"
—multiple selection of basic material and its finish facilitates maintaining appearance in stamping the part or its further processing

Features of COMMERCIAL Stampings

Specialized equipment
—modern presses with capacity over 2000 tons; facilities located in three strategic metal producing centers

Economical large or small runs
—medium to heavy, shallow or deep drawn stampings

Facilities for finishing
—drilling, boring, tapping, machine trimming, burning, welding, painting, etc.

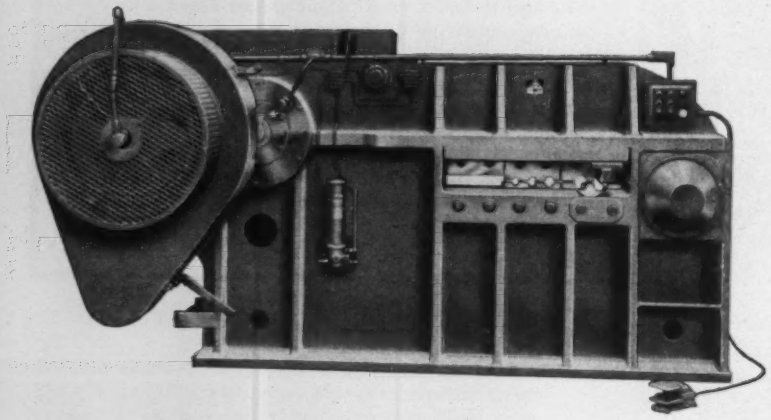
While designs are on the board, or redesign of parts in usage are fresh in mind, why not call on COMMERCIAL'S technical service—send print, sketch, sample or prototype. Address: Commercial Shearing & Stamping Company, Dept. L-13, Youngstown 1, Ohio.

COMMERCIAL
shearing & stamping

popular size

HILL ACME Bar-Billet Shear

cuts rounds, squares and flats without knife change



simple, rugged design

The Model 500 HILL ACME Bar-Billet shear has cutting capacity of 4½" in rounds or 4" in square mild steel. The basic principle of lever and fulcrum is employed for maximum efficiency with low power input.

versatile

With free running speed of 35 cuts per minute, high production is assured. The 36" knife permits cutting of rounds, flats, etc. without knife change. All models are available with fully automatic, semi-automatic or hand feed.

size range

HILL ACME Bar-Billet shears are made in a range of sizes to efficiently accommodate every commercial requirement. Bulletin BB-61 gives complete details.

The HILL ACME Company

Also Manufacturers of:

"CANTON" ALLIGATOR SHEARS • "HILL" HYDRAULIC SURFACE GRINDERS • "ACME" FORGING MACHINES • "CLEVELAND" KNIVES • MECHANICAL LIFTERS • "KLING" METAL WORKING MACHINERY

1201 WEST 65th ST., CLEVELAND 2, O.

CALENDAR
OF MEETINGS

Apr. 4-7, Metal Treating Institute: Spring meetings, Hotel Riviera, Las Vegas. Institute's address: Box 448, Rye, N. Y. Executive secretary: Herbert R. Herington.

Apr. 10-11, American Society of Mechanical Engineers: Maintenance and plant engineering conference, Bancroft Hotel, Worcester, Mass. Society's address: 29 W. 39th St., New York 18, N. Y.

Apr. 13, National Association of Architectural Metal Manufacturers: Metal curtain wall clinic, Plaza Hotel, New York. Association's address: 228 N. LaSalle St., Chicago 1, Ill. Executive secretary: William N. Wilson.

Apr. 25, National Association of Secondary Material Industries Inc.: Pacific Coast regional meeting, Beverly-Hilton Hotel, Los Angeles. Association's address: 271 Madison Ave., New York 16, N. Y.

Apr. 26-28, Society of the Plastics Industry Inc.: Western section conference, Hotel del Coronado, Coronado, Calif. Society's address: 250 Park Ave., New York 17, N. Y. Director of public relations: Langdon P. Williams.

Apr. 30-May 3, Chamber of Commerce of the U. S.: Annual meeting, headquarters offices, Washington. Address: 1615 H St. N. W., Washington 6, D. C. Executive vice president: Arch N. Booth.

Apr. 30-May 3, Liquefied Petroleum Gas Association Inc.: Annual meeting and exhibit, Conrad Hilton Hotel, Chicago. Association's address: 11 S. LaSalle St., Chicago 3, Ill. Secretary: Arthur C. Kreutzer.

Apr. 30-May 3, National Screw Machine Products Association: Annual meeting, Somerset Hotel, Boston. Association's address: 2860 E. 130th St., Cleveland 20, Ohio. Executive vice president: Orrin B. Werntz.

Apr. 30-May 4, Electrochemical Society Inc.: Annual meeting, Claypool Hotel, Indianapolis. Society's address: 1860 Broadway, New York 23, N. Y. Executive secretary: Robert K. Shannon.

Apr. 30-May 6, National Management Association: Advanced management institute, Granville Inn, Granville, Ohio. Association's address: 333 W. First St., Dayton 2, Ohio.

ANY KIND, ANY WAY, SHAPE OR FORM

A CALL TO YOUR LOCAL STEEL SERVICE CENTER ENDS IN-PLANT SHORTAGES *FAST!*

He's a well-stocked, well-equipped source of immediate steel supply, either on an emergency or regular basis. Any kind, any way, shape or form. And best quality. For instance, Weirton Steels: Weirkote continuous-process zinc-coated sheets, Weirzin electrolytic zinc-coated sheets, Weirton hot- or cold-rolled sheets. Whatever your production needs, your local steel service center is ready to give instant service. All you have to do is phone, and steel is on its way to you.

WEIRTON STEEL
Weirton, West Virginia

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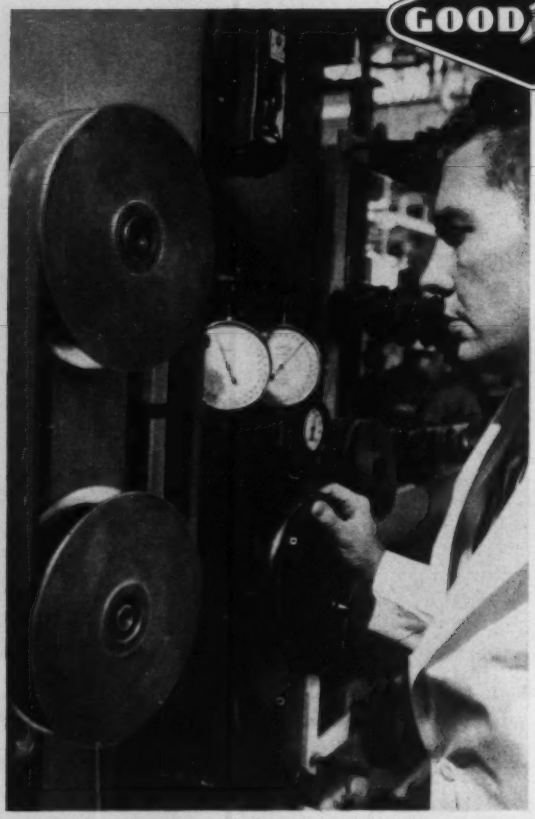
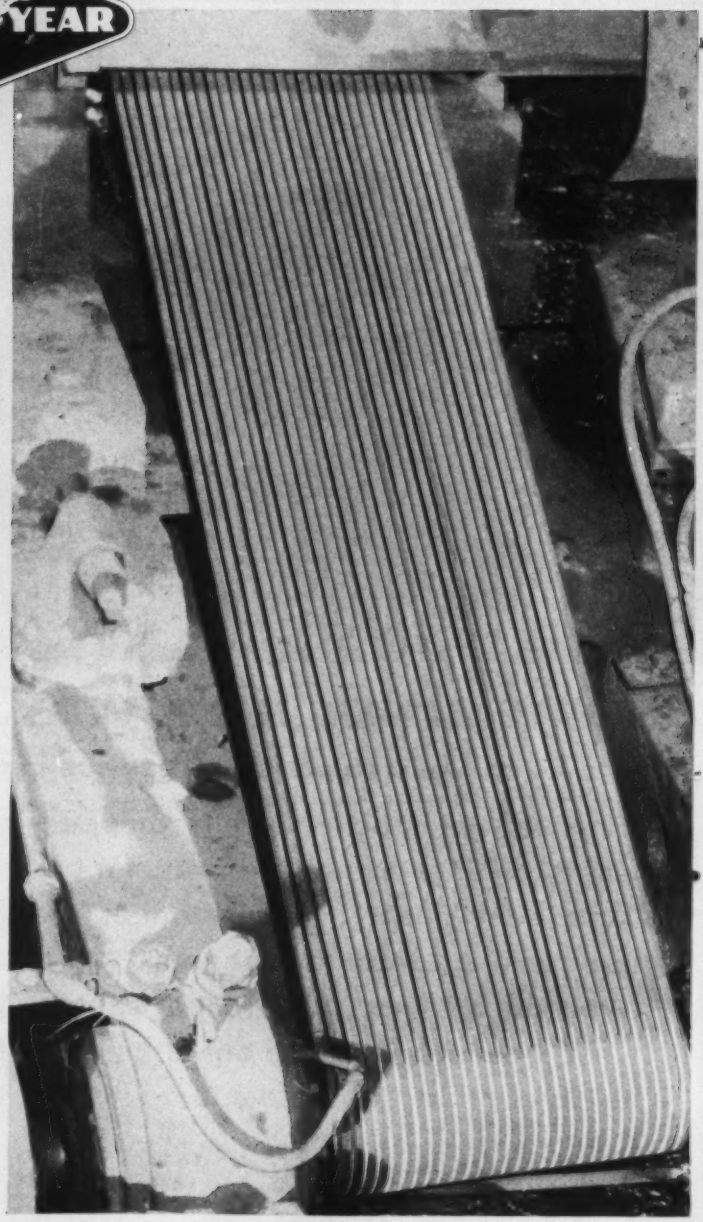
IS YOUR SIGN OF V-

GOODYEAR



Goodyear V-Belts' precision matching comes from this exclusive close-tolerance matching equipment that length-codes each belt to 1/32". Most other belt manufacturers code only to 1/10".



Goodyear V-Belts' precision matching assures standout performance. Example: only 28 COMPASS-V-Steel Belts handle this big steel saw, normally calling for 42 belts. Result: the steel mill saved $500 at the original installation — will save more at every belt change.

THE GREEN SEAL BELTS CODED TO 1/32"

Here's your assurance that every belt in a set matches in length – pulls together for maximum trouble-free horsepower hours

What's more, the Green Seal means –

Dimensional stability that lasts the life of the belt–thanks to shrink- and stretch-resistant "muscles" of 3-T Process Cord or airplane-type steel cable built into each belt.

Satisfactory performance even when subjected to dampness – because of special mildew-inhibited compounds.

The most complete line of V-Belts anywhere today – always within easy reach through a nationwide network of distributor stocks.

The proper selection of V-Belts to meet your requirements with the help of the G.T.M.– Goodyear Technical Man – America's top belting specialist.

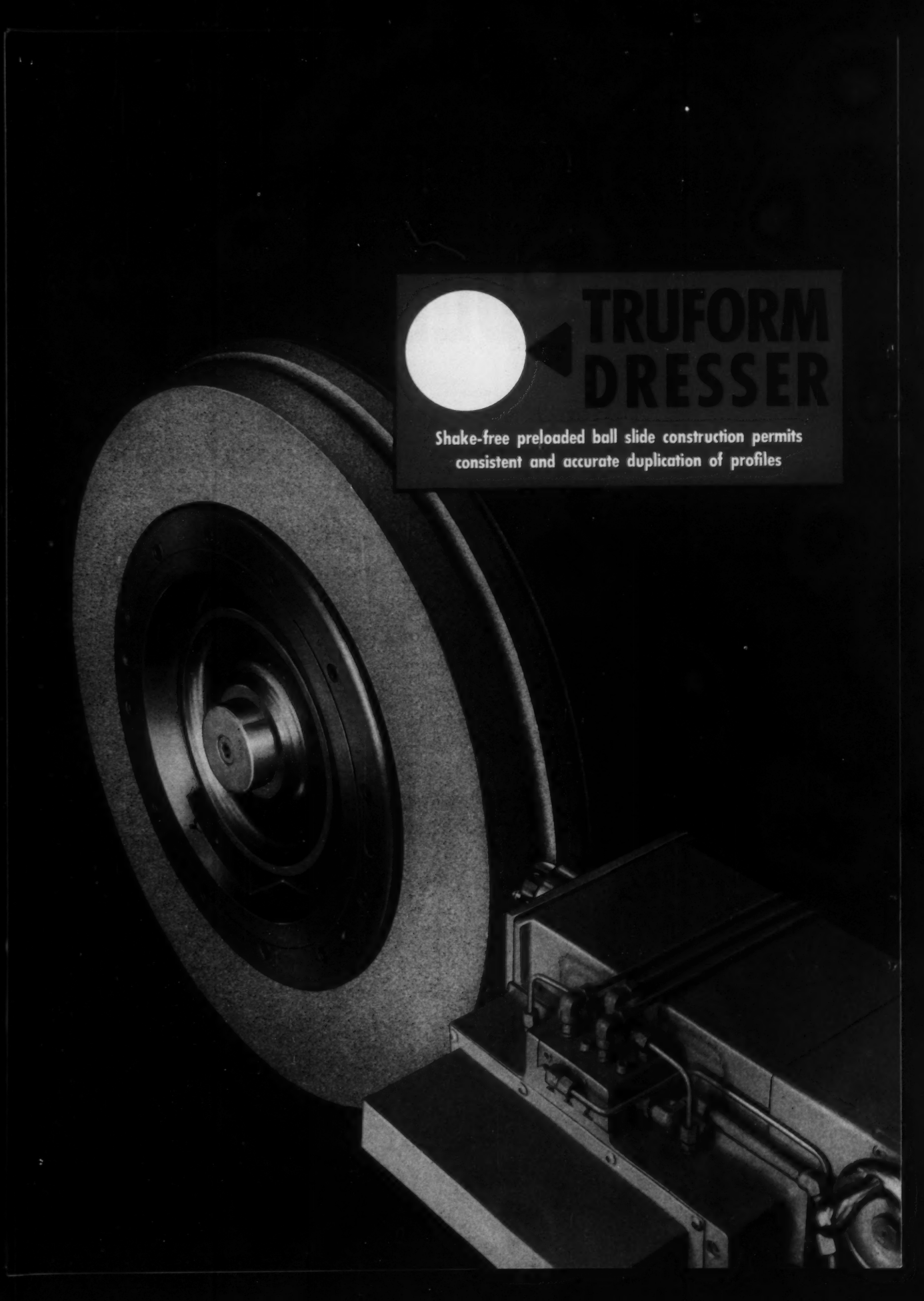
So make the GREEN SEAL your sign of savings–in both time and money–by calling your Goodyear Distributor. Or write Goodyear, Industrial Products Division, Akron 16, Ohio.

Lots of good things come from

GOODYEAR

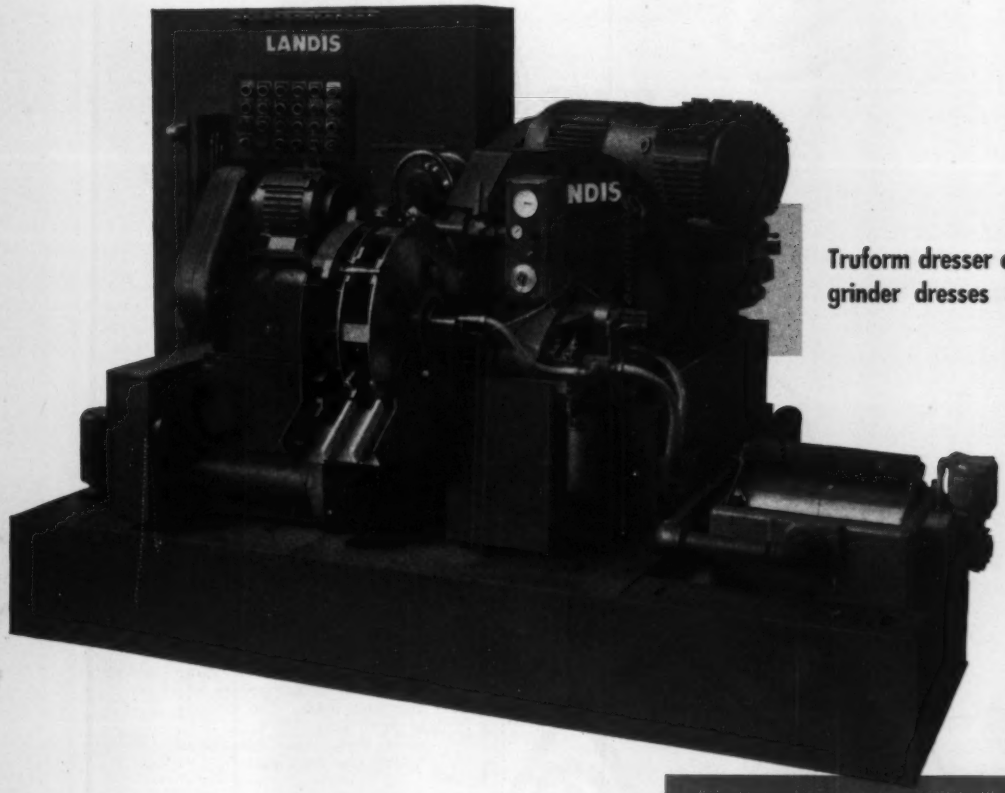
INDUSTRIAL PRODUCTS

Green Seal, Compass–T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio


TRUFORM
DRESSER
Shake-free preloaded ball slide construction permits
consistent and accurate duplication of profiles

Landis Truform dresser adds new accuracy to cylindrical grinding

- assures exact duplication of profile on the wheel
- delivers consistent, repetitive accuracy with minimum attention
- eliminates time lost in reworking profile bars
- dresses profiles in either direction up to 60°
- saves on diamond costs
- available on many new Landis grinders



Truform dresser on Landis plunge grinder dresses unusual profiles

LANDIS

world leader in precision grinders

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Clips, Collars,
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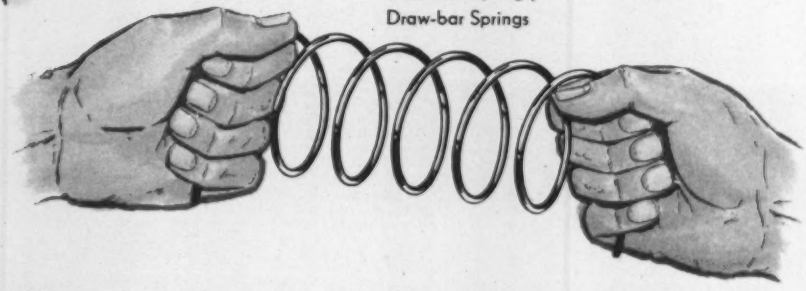
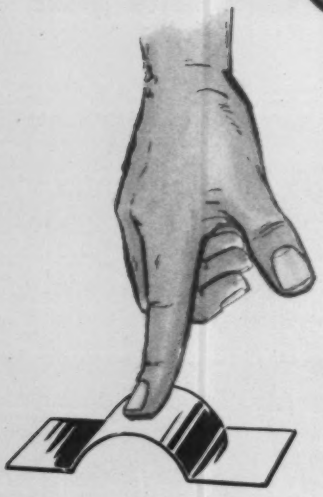
PULL
Extension Springs,
Draw-bar Springs





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Where Do Engineers Earn Best Salaries?

The latest Engineers Joint Council survey of engineering income (covering 165,000 engineers in industry) shows a national median of $9600 for all fields as of mid-1960. That's a 9.7 per cent gain since 1958. Here's how industries compare . . .

MEDIAN SALARIES BY YEAR OF ENTRY INTO PROFESSION

Industry	1960	1955	1950	'44-'46	'30-'34	Thru '24
Aircraft & Parts	$6,450	$8,725	$10,850	$12,900	$13,175	$11,525
Chemical	6,325	7,900	9,825	11,675	14,450	15,175
Electronics	6,575	8,375	10,550	11,900	13,075	13,600
Instrument Mfg.	6,325	8,425	9,825	10,675	11,500	11,825
Petroleum	6,250	7,525	9,025	10,650	14,100	15,750
Research & Dev.	6,825	9,225	11,225	12,475	13,600	15,125
All Industries	6,350	8,200	9,975	11,250	12,575	12,950

New Container Concept Unveiled

A new rail concept that permits interchangeable handling of large or small containers in standardized modular sizes has been unveiled by REA Express. Built by Pullman-Standard, the car accepts special containers produced by Trailmobile. Containers range from 5 by 8 by 8 ft to 40 by 8 by 8 ft. Loading and unloading are simple, rapid, and require little labor.

Firms Probe Conflicts of Interest

Look through the 1960 annual reports of major metalworking firms, and you'll find frequent references to company controls established to detect and prohibit conflicts of interest among employees. Inland Steel Co.'s report states: "To be assured that none of its directors, officers, or other members of management had relationships with firms doing business with Inland of such a nature or magnitude as to constitute a possible conflict of interest, the company conducted an inquiry which confirmed our previous belief that

no such situations exist." Continental Steel Corp. said that "in response to an inquiry on the subject," it had checked into the matter and found its employees innocent. It noted the existence of controls on the purchasing department.

Our Pressure from Wages

One metalworking employment dollar will generate only about $2.60 in sales this year if present trends continue. It generated $4.01 in sales in 1950. How can we relieve the impact of rising employment costs on our sales and profits? Safest and most effective are these remedies: 1. Know where you're going so you can make better long range plans. 2. Motivate your people to greater efficiency. 3. Mechanize. 4. Cut indirect labor costs. For more tips, see Page 81.

Machine Tools: Cutting Types Up, Forming Types Down

New orders for cutting type machine tools increased in January, while orders for forming types plummeted. The National Machine Tool Builders' Association reports preliminary net new orders for cutting types totaled $39.25 million in February—up from $35.75 million in January. Net new orders for forming types totaled $6.7 million in February vs. $20.35 million in January. February orders for forming types were the lowest since July, 1958.

Bendix Unveils Frictionless Bearing

This is a new type bearing—frictionless and needing no lubrication—that has been developed by Bendix Corp.'s Utica Div. Dubbed the "flexural pivot," it's designed to replace ball bearing assemblies and jewels in missile and aircraft components. What appear to be crosshairs in the bearings are really flat steel springs that connect two separated "halves" of the unit. Their flexing permits 60 degree rotation with no rubbing.

New Plastic Will Stop a Bullet

The goal: Find a use for a byproduct. The result: A new, tough plastic with "excellent bullet stopping properties" that has advanced to the "promising" stage. Such is the genesis of a new material from Olin Mathieson Chemical Corp. In lab tests, a $\frac{5}{8}$ in. thick layer of the plastic stopped a 30 caliber bullet at 5 to 20 yards. In another test, bars of the plastic were sharpened on one end and driven through metal sheets. Application possibilities, when the material is perfected, include armor, autos, shoe soles, boats, pipe fittings, impact tools.

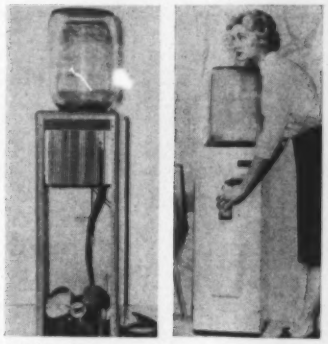
Plastic Wheels to Cut Ton Off Army Tank

Plastics are taking on one of their toughest applications so far—wheels for Army tanks. Engineers at Firestone Tire & Rubber Co. say the move will

shave a ton off the tank's weight. Present tanks have 18 wheels, each containing 155 lb of metal. The new wheels, made of glass fiber reinforced with epoxy, weigh about half that, including a steel rim needed to disperse heat. The wheels are pressure molded.

Thermoelectric Water Coolers

In April, Westinghouse Electric Corp. will begin production of thermoelectric water coolers. Since the units draw their cooling effect directly from the electricity with no moving parts, the traditional motor-compressor and refrigerant system are eliminated. Space savings amount to 25 per cent compared with a standard water cooler.

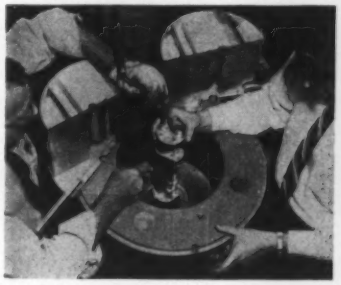


Good News for Firms in Depressed Areas

The Commerce Department is spearheading a co-operative movement among state and local agencies and federal procurement officials to increase the placement of government contracts in areas of persistent unemployment. The initial effort is in Pennsylvania. Commerce circulates a list of firms in the labor surplus area, with their qualifications, to government agencies with procurement functions; they forward them to contractors with the request that "maximum consideration" be given them in the placing of contracts.

Nuclear Gaging Checks Moisture in Foundry Sand

Nuclear gaging keeps a close check on moisture in foundry sand at the Danville (Ill.) plant of General Motors Corp.'s Central Foundry Div. The system features a probe containing a radioactive material. It indicates the moisture content and tells how much water is needed to put the mixture within specifications. Test time: Less than 1 minute (Page 164).



Poor Security Practices Cost Millions

Millions of dollars are lost annually through pilferage, the employment of undesirables, and the loss of company secrets and invaluable knowhow. "Some experts estimate the loss through theft or pilferage may be as high as 3 to 5 per cent of gross sales," says John L. Buckley, security director, United Technology Corp., Sunnyvale, Calif.

Capital Demands to Rise; Interest Rates May Follow

Look for a $1 billion increase (to $28 billion) over last year's figure in the volume of long term financing this year, predicts Bankers Trust Co., New York. A record $31.5 billion was raised in 1959. The forecast assumes "that the sag in business activity will soon taper off and that evidence of recovery will

STEEL The Metalworking Weekly

March 27, 1961 Vol. 148 No. 13

CONTENTS

THE EDITOR'S VIEWS:
Wages vs. Sales 67

WINDOWS of WASHINGTON:
What McNamara Has Accomplished 78

MIRRORS OF MOTORDOM:
What Weight Means to Automakers 87

THE BUSINESS TREND:
FRB Index Holds, Sparks Optimism..91

NEWS SECTION:
March Business Perks Optimism ...71
March Auto Sales Turn Up 72
Defense Buying Helps Economy 73
Get Most from Numerical Control..74
Breakthrough Comes in Aluminum..76
Modine Mfg. Co. Aids Wholesalers..77
Program for Management—The Pressure of Wages 81
New Aluminum Source Developed ..101

TECHNICAL SECTION:
Technical Outlook 163
Nuclear Gage Checks Foundry Sand 164
Electron Beam Welds Moly Sheets..166
Rohr Puts Electroforming on Line..168
Titanium Cast in Permanent Molds 170
Progress in Steelmaking—New Center Accents Raw Material Study..172
Extrusions Reduce Panel Costs 175
New Stainless Has Three Benefits ..178
Nonferrous Machining Speeded ...184

MARKET SECTION:
Market Outlook 197
Complete Index to News and Prices 197
Wiremen Fighting to Hold Markets 199
Canadian Steel Rate Pushed Up ...200
District Ingot Rates and Chart 202
Scrap Price Surge Is Continuing ..212
Scrap Tops Pig Six Months in Row 213
Iron Ore Imports Down 3% in '60..213
Nonferrous Metals—Antitrusters Move In on Copper, Brass 216

DEPARTMENTS & INFORMATION:
Servicenter 5
Editorial and Business Staffs 6
Calendar of Meetings 10
Metalworking Week 17
Metalworking Pulse 20
Men of Industry 95
New Products 187
New Literature 195
Advertising Index 221

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appear within the next few months." Demands for short term funds, however, will be "substantially less" than they were a year ago, the bank says, partly because consumers appear less willing to add to their debt. Indications are that ample credit will be available to meet the needs, says the bank, but it warns that "underlying economic forces may be pointing toward higher interest rates later in the year."

New Labor-Management Group Meets

A 6-hour session at the White House last week marked the beginning of the President's ambitious program for getting labor, management, and the public to pull in the same direction. The President stated the purpose of his labor-management advisory committee: "To give direction to the general movement of wages and prices so the general welfare of the country can be served." Perhaps looking ahead to specific labor disputes such as the auto negotiations, he said he didn't want the White House "to come in at the last minute." The group will meet again Apr. 3 and once monthly thereafter.

Straws in the Wind

Brother International Corp., Japanese sewing machine firm, has started making sewing machines at Santry, Dublin, Ireland. Around 10,000 units will be turned out monthly to serve the European market. Ireland is attracting industry by offering tax concessions and has gained around 300 plants in the last three years . . . Turnover among engineering and scientific staffs costs U. S. industry more than $300 million yearly, says Dr. F. J. Gaudet of Stevens Institute of Technology . . . The National Aeronautics & Space Administration, at 9:34 p.m. (EST) on Mar. 10, received its first clear radio signals reflected back to Earth from Venus in a 70 million mile round trip that took about 6½ minutes . . . The Export-Import Bank of Washington has granted a $13 million loan to Spain's government owned steel combine so it can buy cold rolling and other facilities in the U. S. Armco International Corp. will provide technical advice . . . Burroughs Corp. says it has obtained micro-miniature modules "at a fraction of the cost of conventional circuit techniques," thanks to a technique that provides a feasible and economical method of interconnecting elements within a device . . . Induction heating equipment orders in February rose 63 per cent above the January level but fell 31 per cent short of the February, 1960, showing, reports the Industrial Equipment Association.

Metalworking Pulse

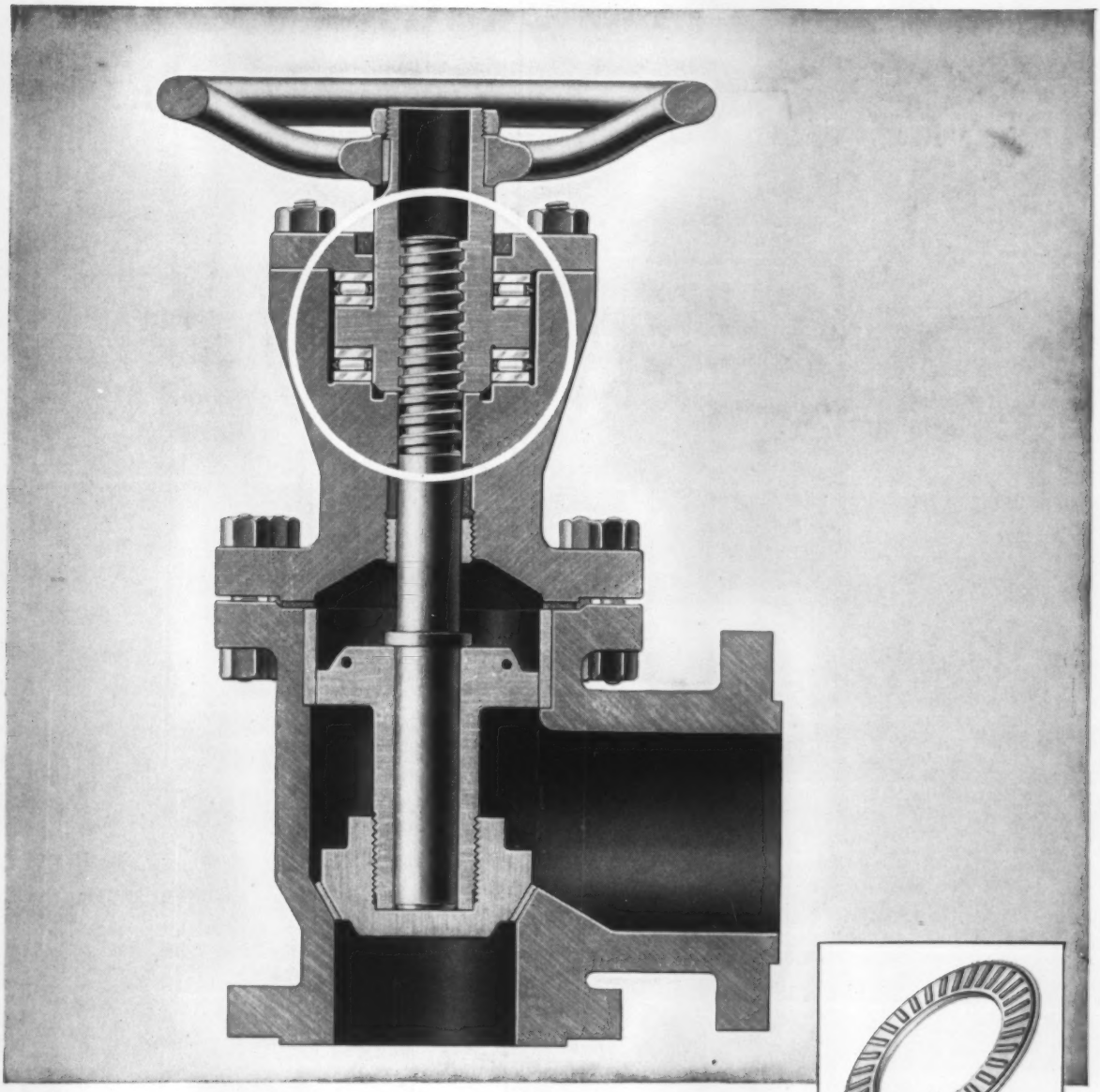
The Business Trend: The 3 point drop in STEEL's industrial production index for the week ended Mar. 18 can almost wholly be attributed to industry-wide shutdowns in the auto industry. **Autos:** Only Ford substantially cut back production for the week ended Mar. 25. All other makers resumed or maintained schedules as increases in sales sparked optimism. **Steel:** The ingot rate for the week ended Mar. 25 is expected to approximate that of the preceding five weeks.

- **INDUSTRIAL PRODUCTION INDEX**
  (1947-49=100)
  Week ended Mar. 18 . . . . 144†
  Year Ago 177
  Details on Page 91

- **PASSENGER CAR OUTPUT (UNITS)**
  Week ended Mar. 25 . . 84,000*
  Year ago 137,385
  Details on Page 88

- **STEEL INGOT OUTPUT (TONS)**
  Week ended Mar. 25. 1,574,000*
  Week ago 1,574,000

†Preliminary. *Estimated.
Details on Page 202



Compact valve design, easier operation with Torrington Needle Thrust Bearings

High thrust capacity, thin cross section and low unit cost have made Torrington Needle Thrust Bearings a natural choice for top valve performance. With Torrington Needle Thrust Bearings, only a fraction of the normal closing effort is needed. This puts less strain on the valve... means smoother, more reliable operation. Lifetime pregreasing insures peak efficiency over years of extra service life.

Torrington Needle Thrust Bearings are exceptionally compact. They provide an assembled height far less than any other type of thrust bearing. They may be run directly on adjacent hardened and ground surfaces, or, as shown above, on standard Torrington thrust races.

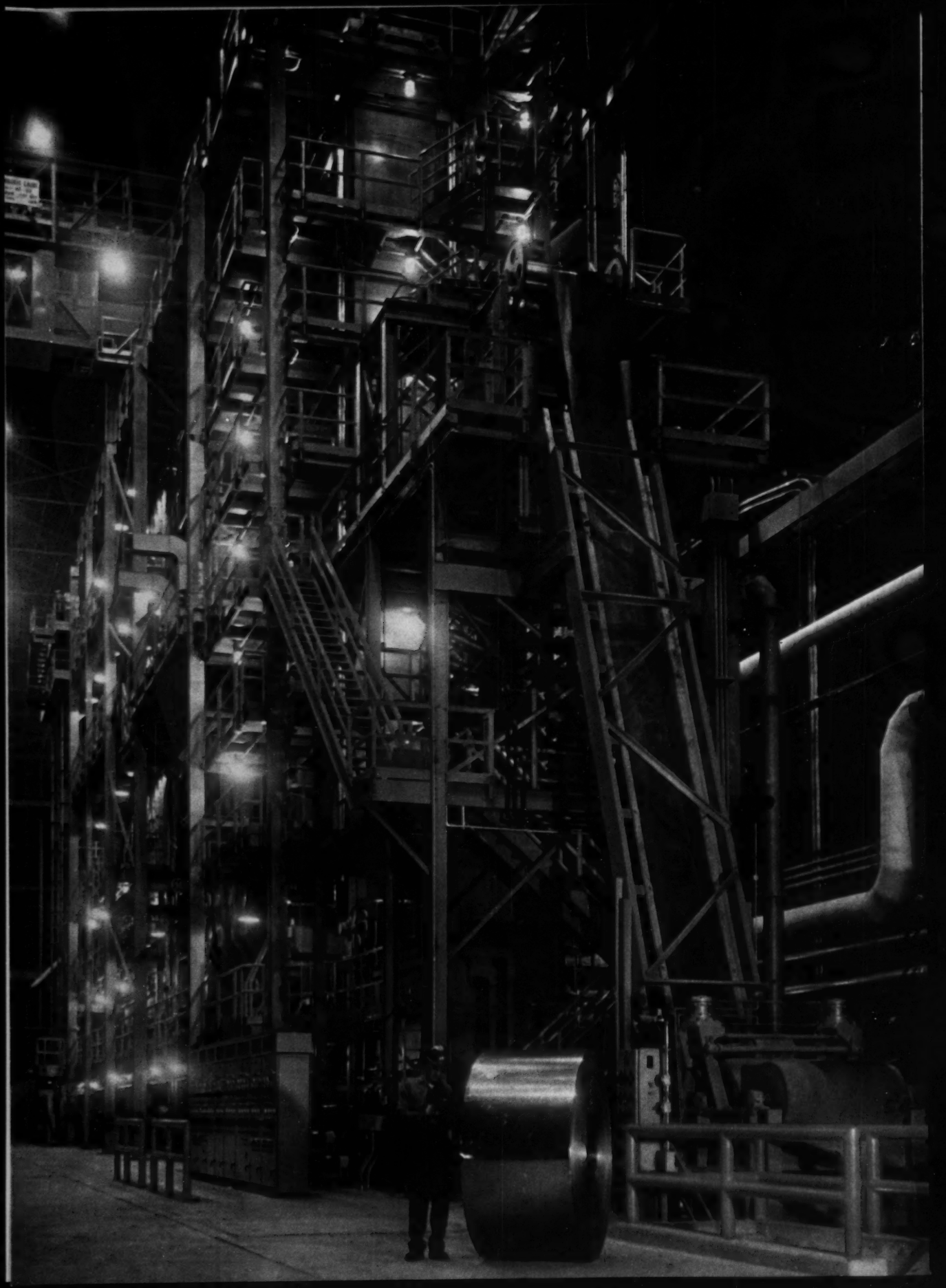
If you make gate valves, globe valves, angle valves—in fact, any valve closed on a threaded stem—you'll find it pays to investigate the top efficiency of Torrington Needle Thrust Bearings. Call or write Torrington—maker of every basic type of anti-friction bearing.

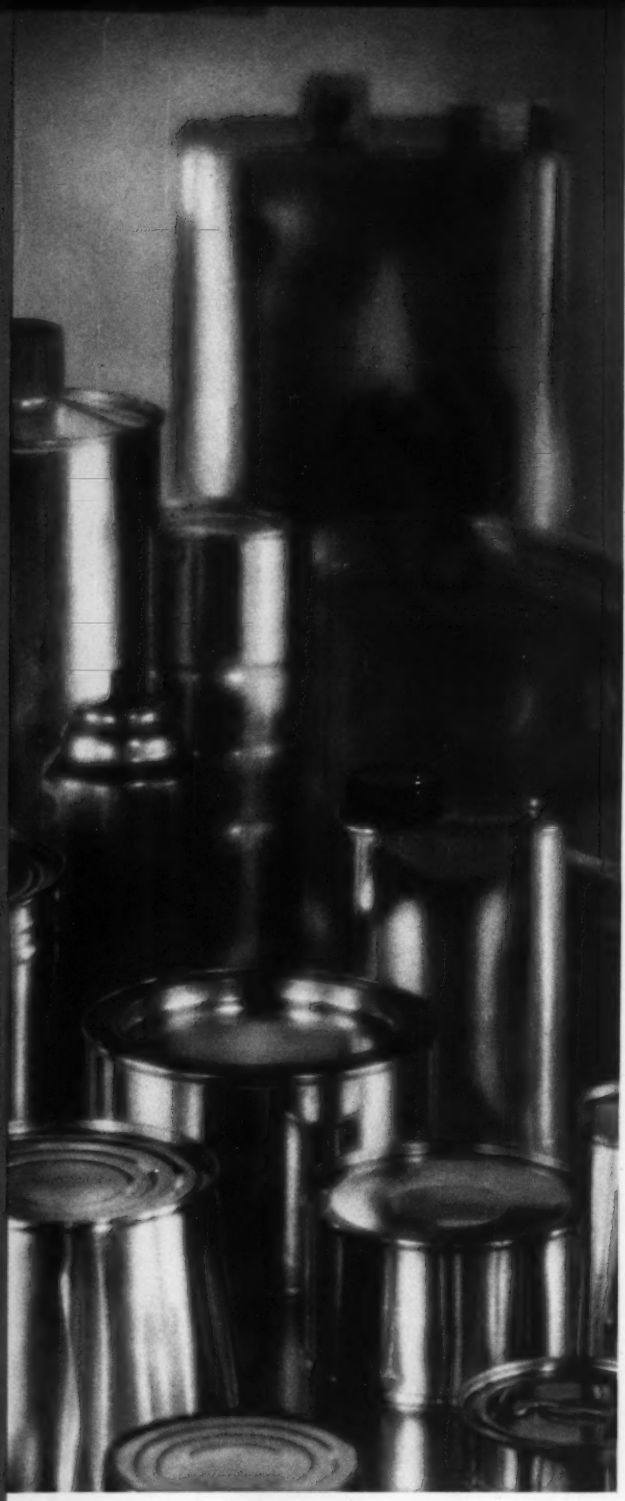
Torrington Needle Thrust Bearing

Torrington Thrust Race

progress through precision **TORRINGTON BEARINGS**

THE TORRINGTON COMPANY Torrington, Conn. • South Bend 21, Indiana





NEW

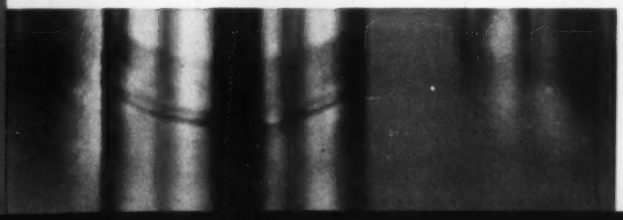
Major mill additions make Youngstown an even better source for higher quality tin plate

New additions to Youngstown's No. 2 Tin Mill at Indiana Harbor include:

- The largest, most modern annealing facilities built to date. Youngstown's new No. 2 Continuous Annealing Line, shown here, has maximum speed of 2000 FPM, producing 60 gleaming tons per hour.
- A new six-stand tandem cold reduction mill —the first, largest and fastest in the world, capable of rolling 7250 FPM of light weight tin plate, in gauges down to .0035. This fantastic speed is nearly 50% faster than that of any mill today.

These major additions to our facilities mean you get more and better tin plate from Youngstown. You get the exact temper and gauge you want . . . fast! And you get the uniform high quality that only an integrated steel-making operation can deliver. For your needs, specify quality tin plate from Youngstown's new facilities.

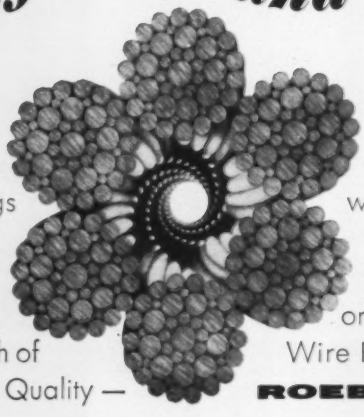
Youngstown – growing force in steel



For full details on Youngstown tin plate, write to: Department 17-B
The Youngstown Sheet and Tube Company, Youngstown, Ohio

We put a lot of work into it
You get a lot of work out of it

quality inside and outside



Take a good look at the pictures. They show you where your savings really start — with the inner and outer uniformity of wires and strands. Unseen, but of utmost importance is the *extra* high strength of Roebling Royal Blue Wire Rope. Quality — inside and outside — is the extra working factor that pays off on the job for *you*. Find out more from your wire rope distributor, or write for free booklet to Roebling's Wire Rope Division, Trenton 2, N. J.

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If the J & L turret lathe insert is missing, write JONES & LAMSON, 517 Clinton St., Springfield, Vermont, for your copy.

Tear it out for your files

Highlights from today's most progressive line of cost-cutting turret lathes and optical comparators . . .

Like all J & L machines and equipment, the products shown on the following pages are available through J & L's "Profitivity" leasing arrangements. No down payment or deposit is required. An hourly rate of $2.50 per $20,000 machine value puts J & L **profitable** productivity into your plant. Send coupon below for complete information.

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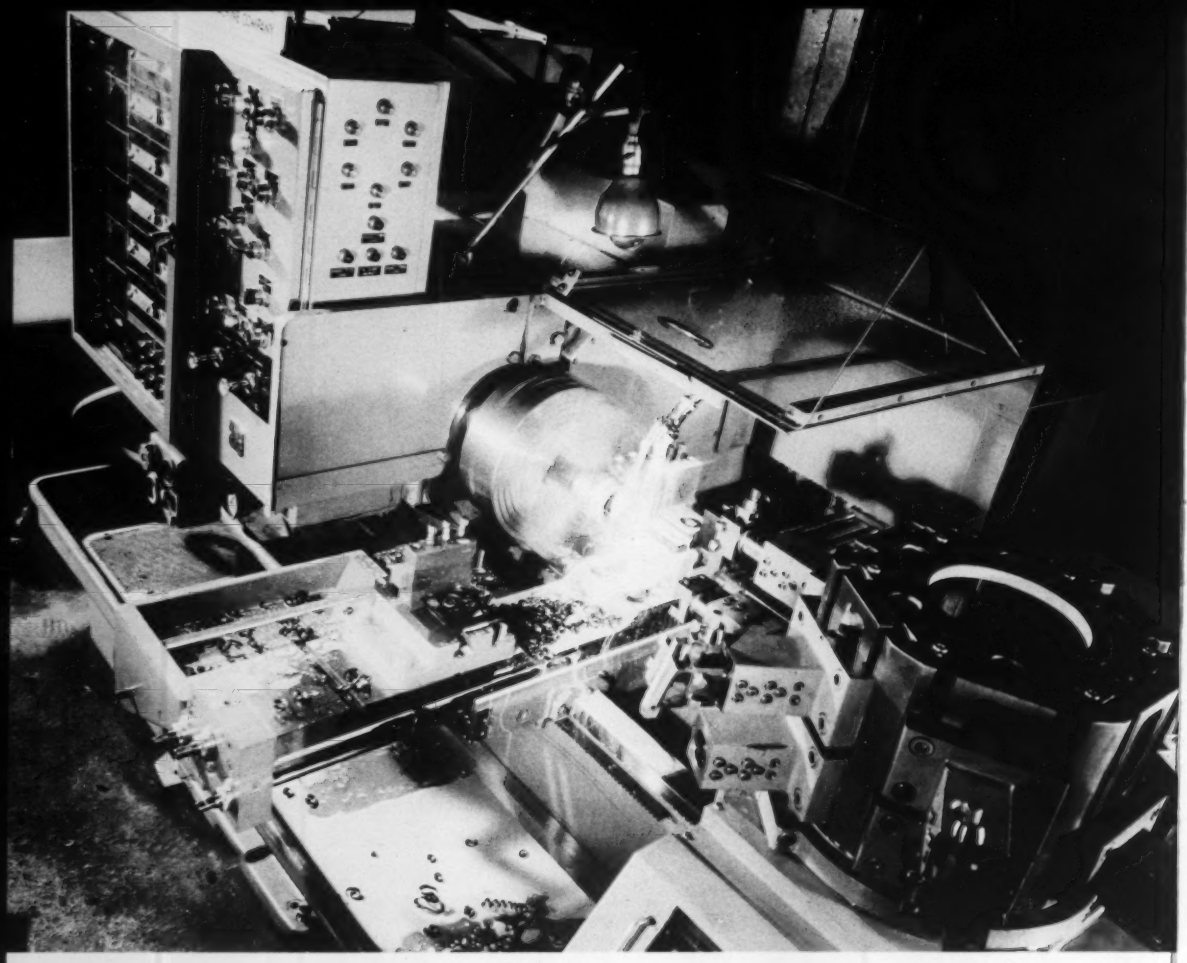


NEW ATL AUTOMATIC TURRET LATHE

Push Button Programming. Fast, Snappy Machine Action. Rugged Capacities for Both Bar and Chuck Work.

This new turret lathe is specifically designed to package the maximum benefits of automatic turret lathe operation. For instance, it has the rugged capacities of a solid saddle type turret lathe (no ram overhang). Combined with this rigidity is extremely fast, positive machine action (rapid traverse of the saddle is 500" per minute and turret indexing, fully tooled, is less than 7 seconds through all six stations).

Machine programming is simple and versatile. The staging panel, conveniently mounted on the machine, consists of clearly labeled push button controls and selector dials for motion sequences, speeds, and feeds.

The ATL is a single package machine design. All components including controls, motors, hydraulics, coolant and electrical circuits are assembled into a compact machine unit; completely interconnected in all respects and ready for shipment, or moving.

The ATL provides up to 40 H.P. for either a 12- or 24-speed automatic headstock. Speed ranges are available with a maximum speed of 2000 RPM. Fifteen feeds are provided for both saddle and cross-slide, with a maximum of 15" per minute on the cross-slide and 30" per minute on the saddle.

The high hexagon turret provides added tooling versatility and simplified tool setting. This turret is used primarily for chuck work although the machine itself is easily converted for either chuck or bar work.

The ATL has rigidity to spare. It has hardened-and-ground steel bedways, a full 14½" stroke on the cross-slide with positive stops, and all other design refinements associated with the accuracy and dependability of Jones & Lamson turret lathes.

CONTROLS and How to Use Them

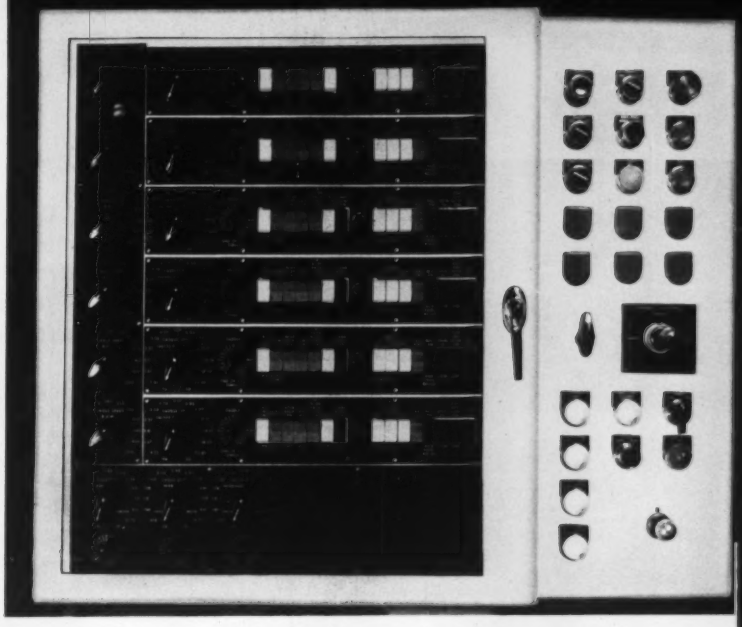
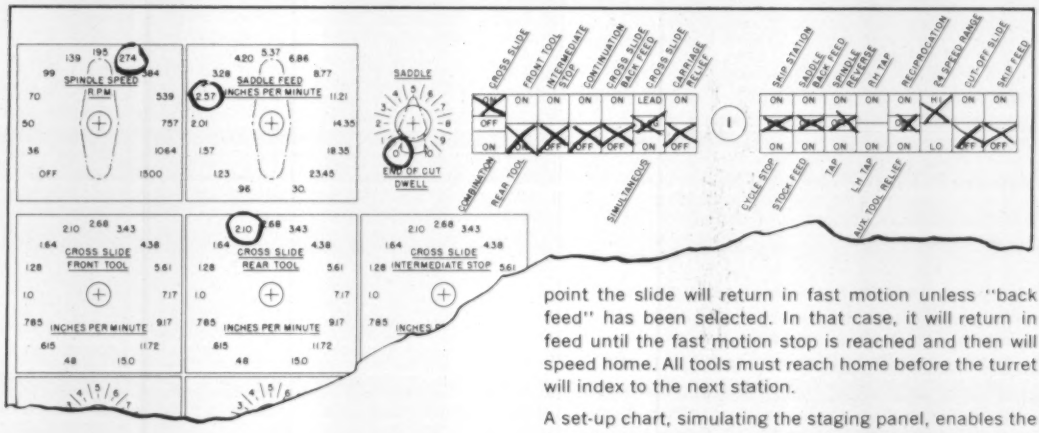


FIG. 1



The ATL may be programmed for completely automatic operation of a variety of machining cycle sequences. These include: bar-feed advance, collet "close" and "open", turret index, rapid traverse for cross-slide and saddle, back-feed, cross-slide lag, cross-slide lead, continuation, intermediate stop, combination cross-slide and saddle, spindle reverse, independent feed rate for each turret face, independent feed rate for front and rear of cross-slide, independent spindle speed for each turret face, independent dwell for front or rear of cross-slide and each turret face.

The cycle chosen can be either manual or automatic. It may be set for a single cycle or to repeat for multiple automatic cycles.

In addition, controls are available to manually traverse the saddle forward and reverse (joy stick); manually traverse the cross-slide in and out (joy stick); to manually engage the spindle in forward, reverse, jog or free position; and to open and close power chucks.

All of this programming is performed through a single staging panel. Clearly labeled push buttons and selector dials enable the operator to select a variety of cycle motions from each hexagon turret position. Dials provide individual, speed, feed and dwell selection for each tooling station. Tool carrying members are always in fast motion until the fast motion stop is engaged. They then automatically go in to feed. When the tool reaches end point the slide will return in fast motion unless "back feed" has been selected. In that case, it will return in feed until the fast motion stop is reached and then will speed home. All tools must reach home before the turret will index to the next station.

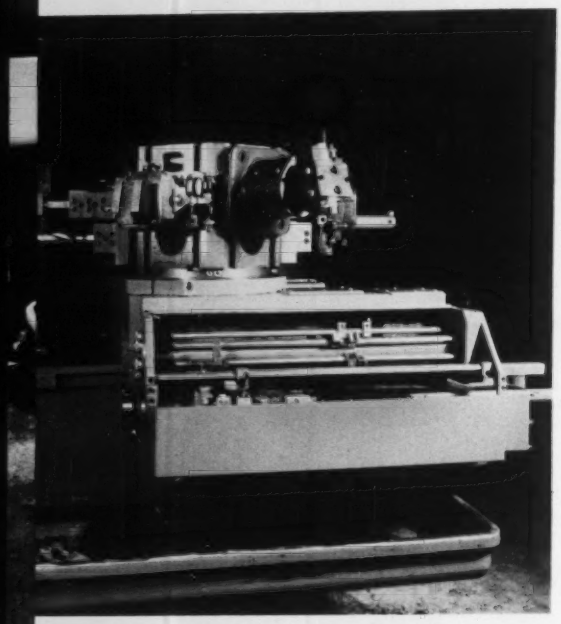
A set-up chart, simulating the staging panel, enables the operator to program machining sequences in a matter of minutes. Speeds, feeds and dwell are shown for each tooling position. The selection of push button positions is also indicated for each station so that the proper automatic machining sequence may be obtained.

Fig. 1 is a section of the set-up chart which illustrates an example of programming instructions for a turret position. Spindle speed dial is set at "274". Saddle feed dial is set at "2.57". Saddle dwell is set at "0". Rear cross-slide feed is set at "2.10". Cross-slide dwell at "0". The push button for cross-slide is set at "on". Cross-slide is set for "rear tool". Intermediate stop is "off". Continuation is "off". Back feed is "off". Cross-slide is set at "lag". Carriage relief is "off". All other buttons for this station are set at "off".

These selections mean that the cycle will start with a spindle speed of 274 RPM. The saddle will advance in fast motion to a knock-off stop. It will then go into 2.57"/-min. feed. When this tool (mounted on the face of the hex turret) reaches its end point, the saddle will return to home in fast motion (500"/min.). The rear tool slide will then advance in fast motion (250"/min.) to a knock-off stop and go into a feed of 2.10" per min. When this tooling reaches end point, the rear slide will return to home in fast motion. All tooling positions now being back home, the turret will index in approximately one second and the machine will proceed to follow instructions from the next selected turret position. And so on through the cycle.

If the J & L turret lathe insert is missing, write JONES & LAMSON, 517 Clinton St., Springfield, Vermont, for your copy.

NEW ATL AUTOMATIC TURRET LATHE



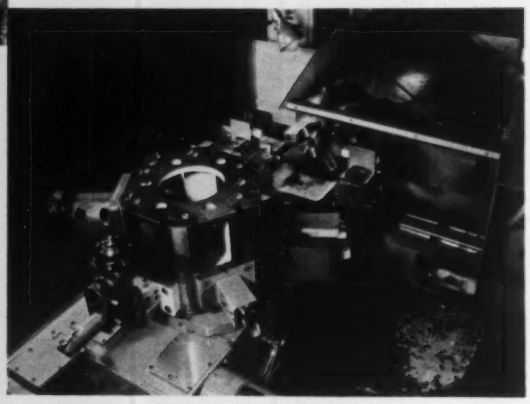
24″ saddle motion provides maximum length of turn . . . maximum rigidity

The 24″ saddle motion is actuated by a closed-loop, two-level, hydraulic servo system. A variable speed, reversible DC motor is used as a velocity reference in the speed feed range. Rapid traverse of 500″ per minute is obtained hydraulically.

The Geneva indexing mechanism allows the turret to be indexed very rapidly (approx. 1 sec.) anywhere along the bedways. Saddle travel is not necessary to index the turret.

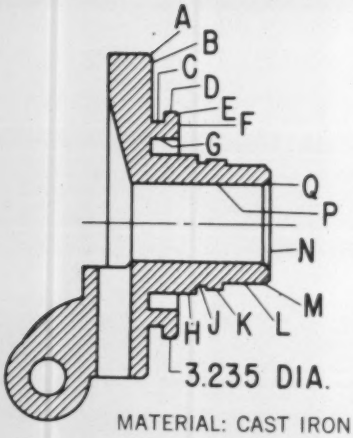
End point control for each tooling station of the saddle is by manually set stops on a 6-sided reel that is geared in synchronism with the hexagon turret.

HIGH HEXAGON TURRET FOR EXTRA TOOLING VERSATILITY



The high hexagon turret is designed for simplified setup of extra tooling at each turret position. Multiple tooling is accomplished by setting a second flange tool holder above the one which is in line with the spindle axis. A variety of cutter holders may then be simply set to accomplish a diversity of operations, either singly or in combination with other tooling.

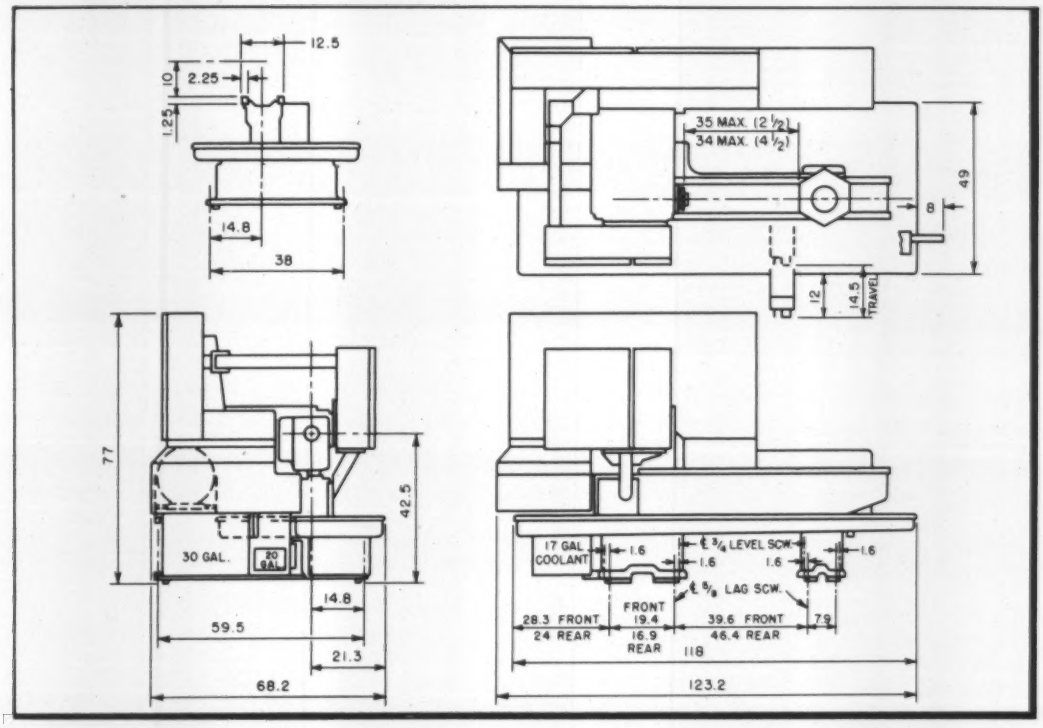
The high hexagon turret eliminates the necessity of multiple turning heads and at the same time provides faster simpler and more accurate tool setting.



MATERIAL: CAST IRON

JONES & LAMSON AUTOMATIC TURRET LATHE				
Turret Position	Cross Slide Position	Operation	Cutting Speed Ft./Min.	Feed Per Rev.
1		R. TURN K, H & D	335	.0147
	FRONT	FACE B, FACE AND NECK J, CHAMFER M	454	.0115
	REAR	GROOVE C — FACE F R. FORM, H — FACE, N	312	.0115
2		TURN, L — BORE, P CHAMFER, Q	406	.0103
3		R. CORE, H-F. CORE, G CHAMFER, E	400	.0054
4		REAM, P-CHAMFER, A	118	.585
5		F. TURN, K-F. CORE, H F. TURN, D	369	.0076
6		THREAD, L	222	.0537

2.50 MIN. FLOOR TO FLOOR — 24 PCS. PER HR. AT 100%



THE ATL OFFERS UNEQUALLED CAPACITY

	ATL 2½		ATL 4½	
COLLET CHUCK CAPACITY	**Minimum**	**Maximum**	**Minimum**	**Maximum**
Round	3/16	2½	1"	4½"
Hexagon	3/16	2⅛	1"	3⅞"
Square	⅜	1¾	1"	3⅛"
SPINDLE				
Hole in spindle	3"		5¼"	
Hole in collet tube	2⅝"		4¾"	
Spindle nose	8" type A-1		11" type B-1 American Std.	

ATL-4½" — Spindle Speeds — twelve (12) forward and reverse (24-speed headstock in same ranges available as option).

18 — 750 range: 18 - 25 - 35 - 49 - 69 - 96 - 137 - 192 - 270 - 380 - 530 - 750

24 — 1000 range: 24 - 33 - 47 - 66 - 93 - 130 - 182 - 255 - 360 - 505 - 705 - 1000

29 — 1200 range: 29 - 40 - 56 - 79 - 112 - 155 - 220 - 305 - 430 - 605 - 850 - 1200

ATL-2½" — Spindle Speeds — twelve (12) forward and reverse — (24-speed headstock available as option)

24 — 1000 range: 24 - 33 - 47 - 66 - 93 - 130 - 182 - 255 - 360 - 505 - 705 - 1000

36 — 1500 range: 36 - 50 - 70 - 99 - 139 - 195 - 275 - 380 - 540 - 760 - 1060 - 1500

40 — 2000 range: 40 - 67 - 93 - 132 - 185 - 260 - 365 - 512 - 719 - 1109 - 1419 - 2000

Swing (12" dia. Universal Chuck)

Over ways . . . . . 21¼"

Over carriage guides . . . . . 18½"

Over carriage cross slide . . . . . 13"

Carriage

Cross travel . . . . . 14½"

Rapid traverse . . . . . 250"/min.

Cross feeds, front and rear — fifteen (15) — .48 - .615 - .785 - 1.00 - 1.28 - 1.64 - 2.10 - 2.68 - 3.43 - 4.38 - 5.61 - 7.17 - 9.17 - 11.72 - 15.0 inches/minute

Hexagon Turret

Turning length . . . . . 24"

Diameter of hole in turret . . . . . 3.125"

Maximum distance from face of spindle to face of turret . . . . . 35" (2½") 34"(4½")

Feeds — fifteen (15) — .96 - 1.23 - 1.57 - 2.01 - 2.57 - 3.28 - 4.20 - 5.37 - 6.86 - 8.77 - 11.21 - 14.35 - 18.35 - 23.45 - 30.0 inches/minute

Rapid traverse . . . . . 500"/min.

Center of tool holes to top of saddle . . . 4⅞"

Bed

Width across ways . . . . . 12½"

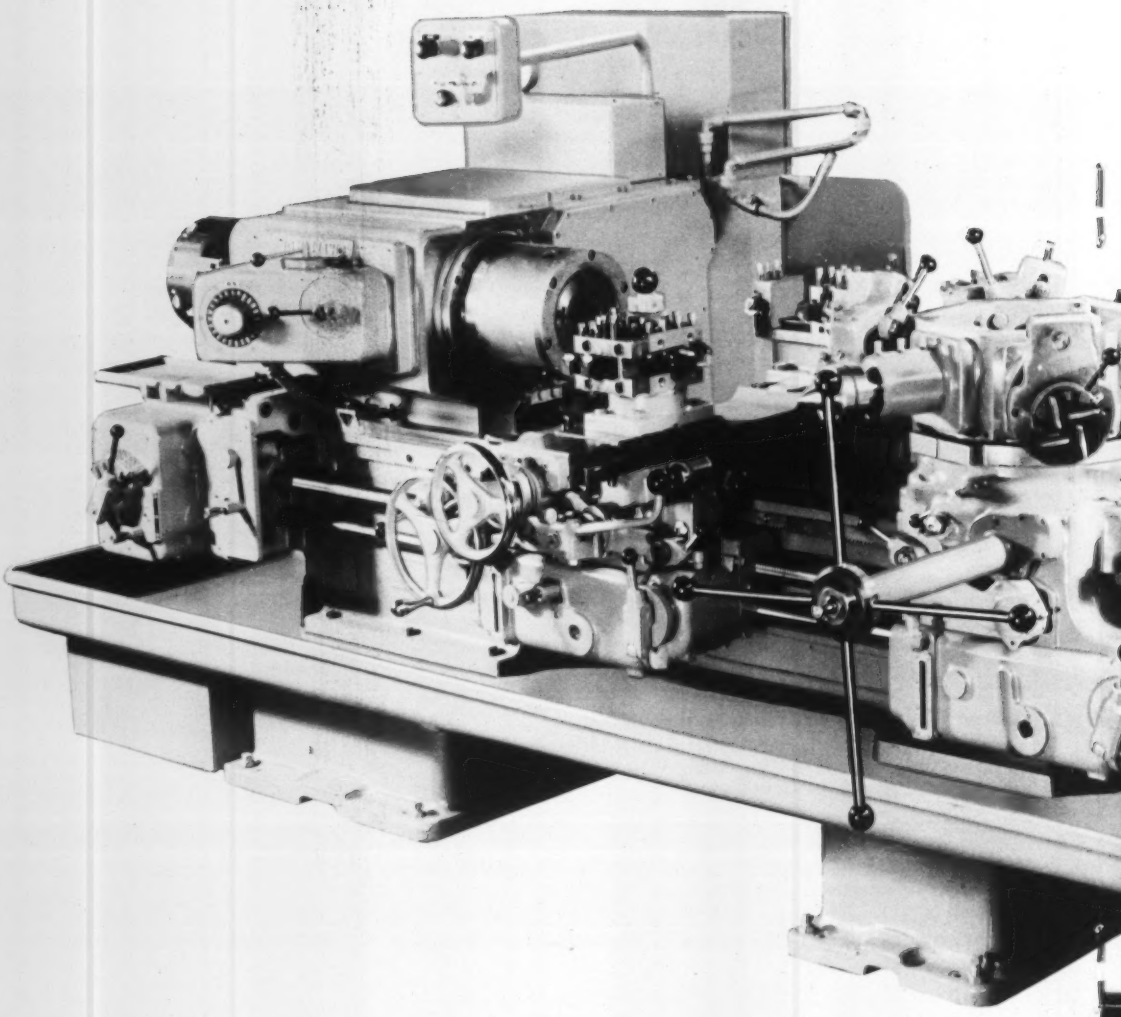
Top of ways to spindle center . . . . . 10"

Motor

40 HP maximum (1800 R.P.M.)

If the J & L turret lathe insert is missing, write JONES & LAMSON, 517 Clinton St., Springfield, Vermont, for your copy.

NEW RAM AND SADDLE



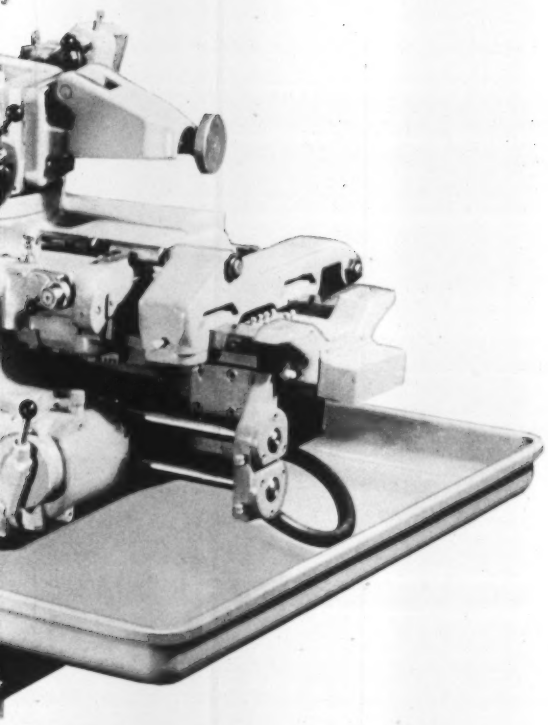
TYPE TURRET LATHES

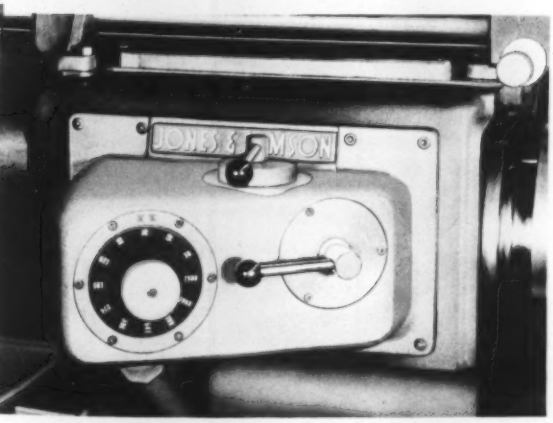
Instant Speed Changes

Hydraulic Clutches

No Gear Shifting

Single Speed Motor





These new J & L lathes are really new. No mere face lifting here. Both lathes have been completely redesigned from the floor up!

Both the Ram type and Saddle type lathes are equipped with multi-speed hydraulic headstocks and are capable of giving you more chips per tool, more pieces per hour, and more profit per job.

The new design of these machines starts with a greater leg depth for more stable footing. New cross-ribbed bed design provides even greater rigidity for heavy cuts — and gives straight-line chip disposal out the back. The new wide pan includes a built-in accessible coolant tank at the head end of the machine. The new headstock transmits up to 40 HP.

An extremely important feature is the hydraulically operated clutches, which change pre-selected spindle speeds quickly and automatically.

Other features include: motor mounted on the rear of the machine; a new carriage of rugged design, on which the stop spool is more conveniently located; heavy duty aprons which allow the adaptation of full length lead screw threading attachments (as well as the extremely versatile 2-Dimension, 180° carriage tracer); built-in independent pumps, which supply forced lubrication to the aprons, carriage, and saddle.

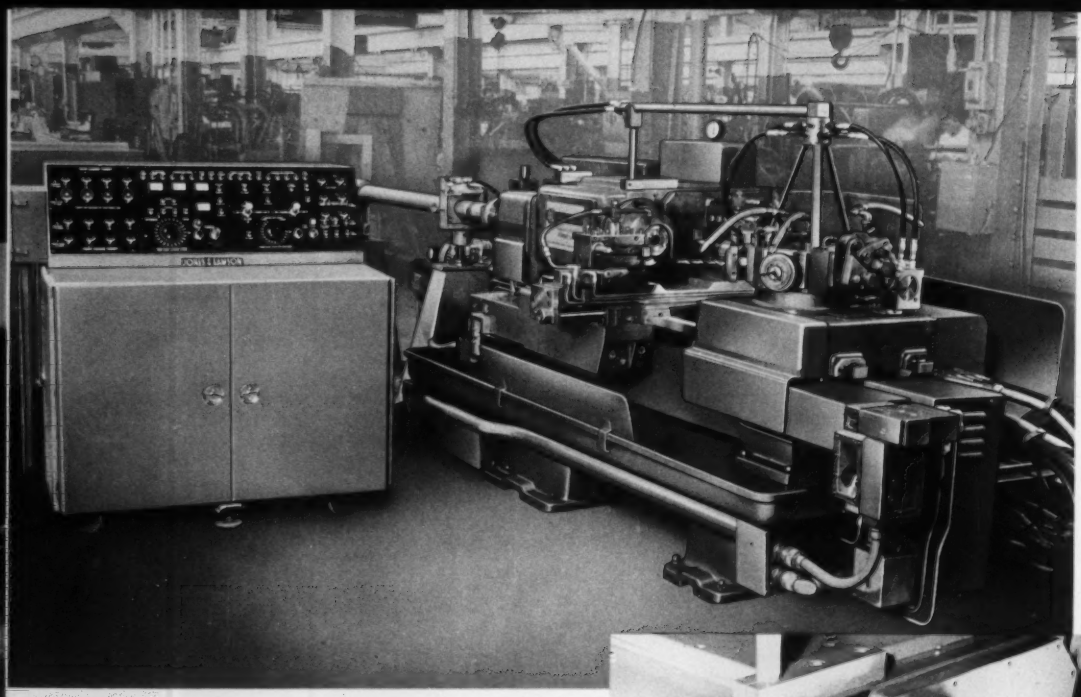
The new Ram type machines are available in #4, #5, #5-3½, and #5-4½ sizes. Saddle types in the new design are #7-2½, #7-3, #7-3½, and #7-4½. 12- or 24-speed headstocks are available.

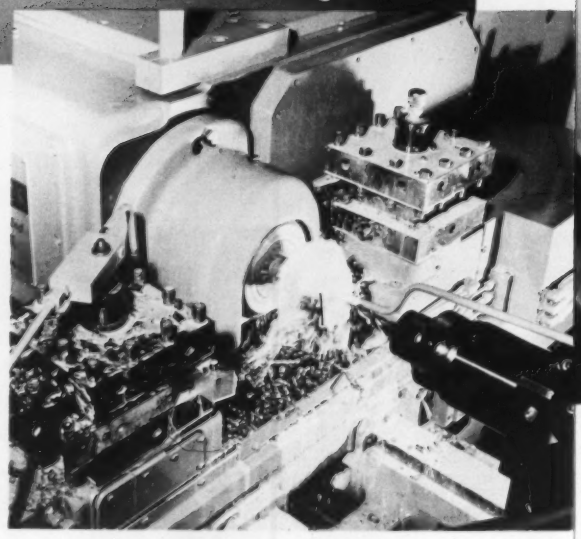
These new machines offer even more power, greater accuracy and easier operation than their famous predecessors.

Spindle Speed Ranges

15-750 RPM, 20-1000 RPM, 24-1200 RPM, 30-1500 RPM, 40-2000 RPM, various speed ranges available dependent upon size of machine.

If the J & L turret lathe insert is missing, write JONES & LAMSON, 517 Clinton St., Springfield, Vermont, for your copy.





TAPE CONTROL TURRET LATHE

Shatters set-up time, lead time, and costs on short runs

After tape and tooling are prepared, the J & L NCTL can be set up and working on the first piece in approx. 15 minutes. And this would be an extreme case where tools at all 14 tooling positions would have to be changed. Now, consider more realistic operations (such as a series of shafts or gear blanks or other similar parts). This is where the probabilities favor the changing of only one or two tools at an average of approx. one min. per tool. And at this point the economic benefits of tape control turret lathe operation become startling indeed.

This turret lathe (built in two sizes, 21" or 30" swing) makes parts automatically using pre-set tools according to instructions provided by standard 1" wide 8-channel punched tapes. It can be set up for either bar work or chucking work.

The carriage, cross-slide and saddle all have motion at any of 16 feed rates or in fast motion. Each slide moves to location within + or −.001" and repeats within + or −.0005". Therefore, repetitive tolerances + or −.0005" on location and on diameter can be expected, after the first piece has been made and adjustments dialed to compensate for tool spring or setting.

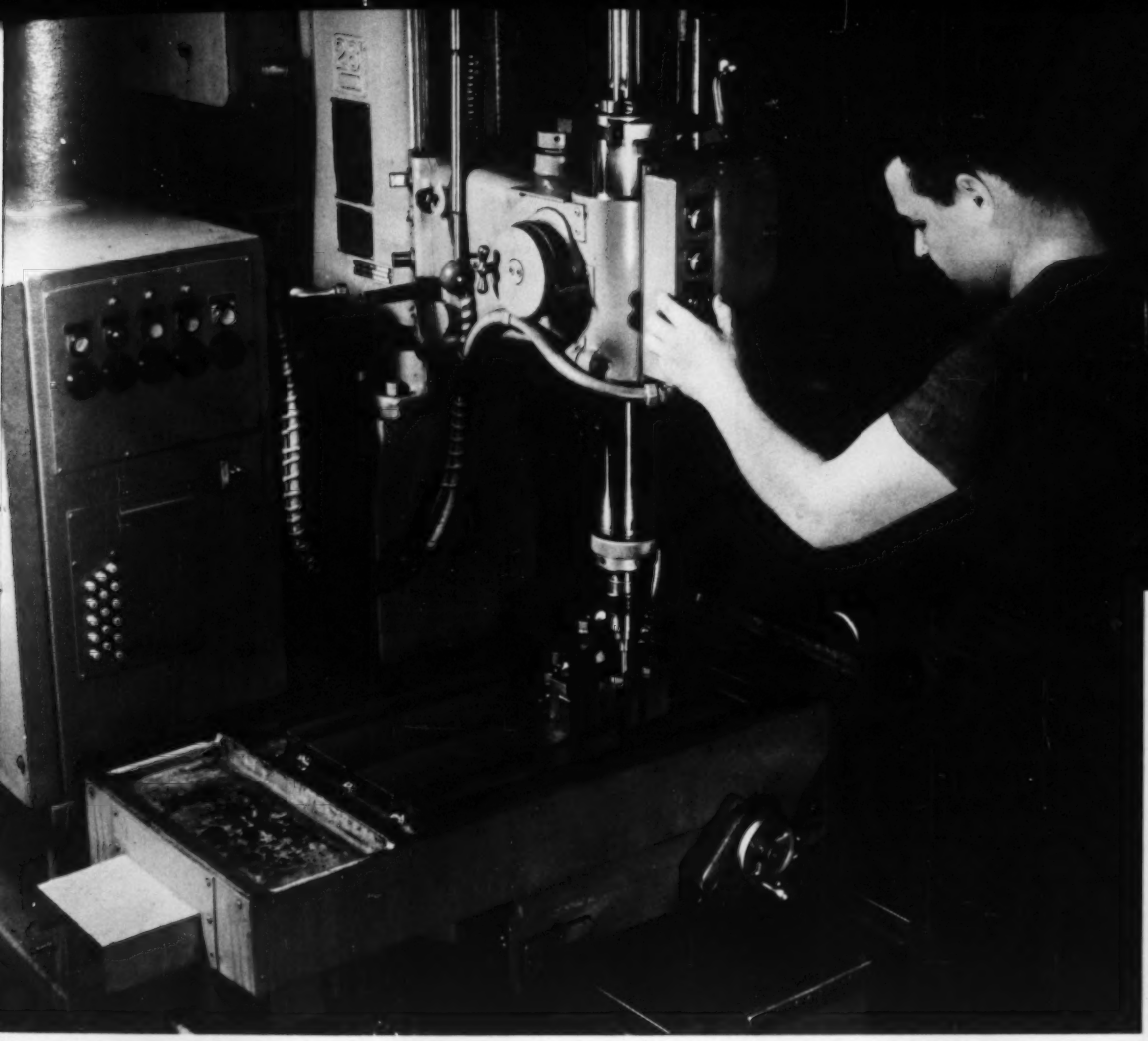
The control system provides tape control for carriage, cross-slide and saddle movements; speed and feed changes; hexagon turret indexing, front and rear square turret indexing; coolant, bar feed, collet chuck; opening and closing die heads and roller turners and accessory tools mounted on the hexagon turret.

Corrections for 22 end-point locations of the tool-carrying members, without need for repunching the tape are provided on the console with up to + or − .015" adjustment. The system is capable of operating two motions simultaneously.

Standard Tape and Code

This numerical control uses a word-address code system. The 1", 8-channel, tape is prepared with an EDP typewriter, such as the Friden Flexowriter. A simple language is used for coding. Alphabetical abbreviations provide functional designations, while numerical information is used to specify speeds, feeds and distance, or end-point, measurements.

Distances are in actual decimal dimensions while speed and feed numbers refer to steps in the feed-speed selection range. For example, from the 24 forward (12 reverse) available speeds, the speed setting code 16 would mean 512 RPM. Speed ranges may vary from a low of 20 to 1000 RPM to a high of 40 to 2000 RPM.



If the J & L turret lathe insert is missing, write JONES & LAMSON, 517 Clinton St., Springfield, Vermont, for your copy.

TAPE CONTROL POSITIONING IS HERE TO STAY

Tape control positioning tables have unquestionably proved their capabilities. They reduce production lead time, eliminate jigs, minimize tool changes and wear, reduce set-up time, increase positioning accuracy, shorten cycle time, reduce operator fatigue and required skill, and insure repetitive accuracy.

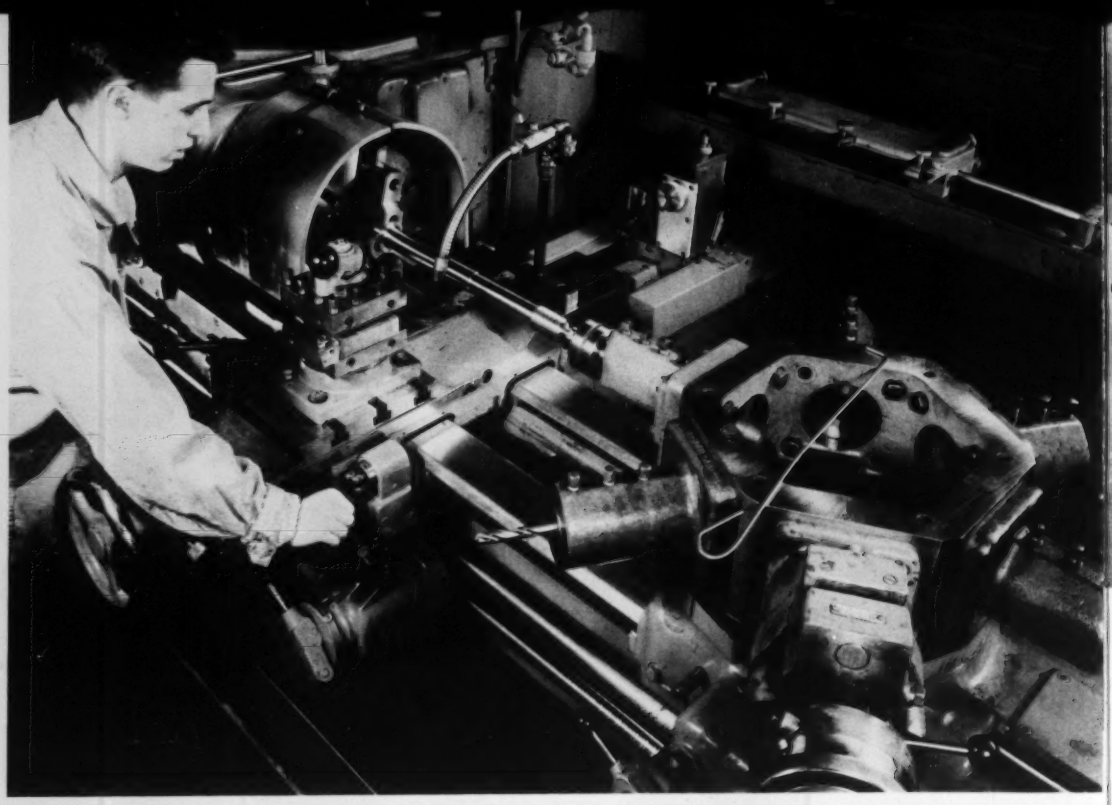
The competitive advantages of J & L Tape Controlled Positioning Tables assure potential users of getting all the above capabilities to the highest degree.

Here's why:

1. The J & L Positioning Table is a solid machine tool, accurately designed and ruggedly constructed.
2. Its design allows for the adaptation of a variety of different types of electronic control units. The user may choose units for purposes of standardization, service, or other reasons.
3. J & L Positioning Tables may be applied to a variety of makes of radial and post drills, including those with automatic cycling and turret indexing.
4. Fast, positive, accurate point-to-point positioning is assured with the J & L Positioning Table. Its closed loop, two-stage hydraulic servo system provides an average travel rate of 190" per minute, including decelerating and stopping at the desired position.
5. Repeatability of the J & L Positioning Table is ±.0005" no matter who's operating it.
6. J & L Positioning Tables have been in operation in the field for over three years. Performance record? Satisfied users answer that question with comments like these: "Saved $4,000 in first 6 weeks of production thru cancelled orders for jig drills."; "Eliminated storage and maintenance of $29,000 worth of jigs."; "Saved an average of 30% to 40% in floor-to-floor time on every job put on a J & L Positioning Table over a full year of operation."

So performance is a matter of record.

Table Travel: 12" x 20", 20" x 20".



180° TURRET LATHE TRACING

Here's the versatile combination that gets the most out of one chucking . . . minimizes handling time . . . increases accuracy.

The J & L hydraulically powered Two-Dimensional Tracer mounts on the rear of the cross-slide carriage of J & L Turret Lathes to provide *complete* machining to tight tolerances. A single stylus and flat template control the cross-slide table travel and longitudinal carriage travel. A single feed selector controls feed in all directions.

Normal turret lathe operations can be used, either in conjunction with tracing, or separately. For example, operator can rough out, trace thru more than 180° of contour while turning, and 180° while facing. *And complete control for diameter is accomplished with the conventional graduated handwheel, for either tracing or mechanical operation.*

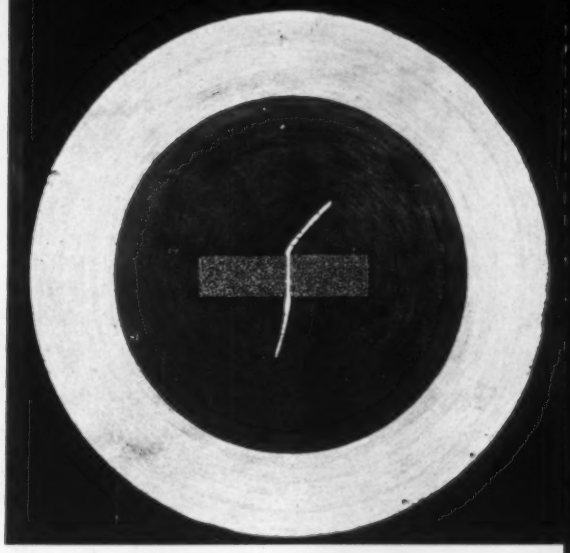
Tracer turning capacity is the same as mechanical capacity of lathe in 20″ increments. Facing capacity is up to 6″ radius change. Feed range is ½″ to 18″ per minute. Cross-slide has hydraulically operated rapid traverse apron and heavy-duty diameter feed screw. 45° and 60° tracing units are also available.

Single Point Threading to a Finish of 15-20 RMS IS COMPLETELY – *AUTOMATIC*

That's right! With the J & L AUTO THREADER straight, taper, and combination threads can be *automatically* chased, internally and externally, to high precision finish.

Mounted on the cross-slide, the AUTO THREADER utilizes the full capacity, rigidity, accuracy, and PRODUCTIVITY of standard J & L Turret Lathes. Precision lead control is maintained by positive engagement of a split-nut follower to the full depth of a hardened-and-ground leader. Uniform thread length is assured by positive stop and follower nut disengagement, together with rapid tool withdrawal. Standard pitches are readily obtained thru interchangeable leaders and followers.

AUTO THREADER utilizes the swing, bar capacity, distance between centers, spindle speeds and motor ratings of the complete line of J & L Universal Ram and Saddle Type Turret Lathes. Max. threading length: 7″ on Standard Turret Lathes, and 11″ on No. 10 Turret Lathes. Threads per inch: 2-64; Max. passes per cycle: 16; Max. tapers: 3½″ per ft. (12″ long standard); 4¾″ per ft. (8″ long optional); Max. number of starts: 4.



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LIGHT CONCENTRATORS WITH J & L OPTICAL COMPARATORS OPEN NEW FIELDS IN MINIATURE ASSEMBLY INSPECTION

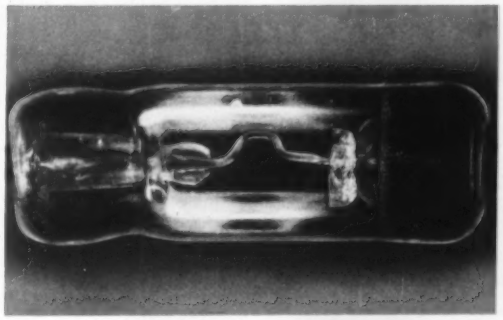
Simply slip on a CENTRALITE or PARABOLITE adapter, and your J & L TC or FC-14 Optical Comparator can take on seemingly impossible inspection jobs!

For example, CENTRALITE (upper left) makes possible the highly accurate image (upper right) of a tiny recording head used in a computer component. Light is concentrated intensely on the head and reflected back through the J & L projection system onto the viewing screen of the Comparator at 31.25 magnifications. Note that the two magnetic poles, separated by a magnetic insulator (white streak) and imbedded in plastic, are clearly visible for inspection.

Tunnel and Mesa Diode Inspection

In illustration at right, PARABOLITE permits detailed inspection of a tiny tunnel diode assembly. PARABOLITE surrounds the diode with concentrated light to provide an extremely sharp image at 31.25 magnifications. By simply rotating the diode, inspector can take a close look at seal, bubble configuration at fusion points, joining of the lead wire to the bead, gold contact to wafer, surface condition of wafer, and other vital details.

Two simple ways to *tailor* light to your inspection appli cations.



This reproduction of the reflected image of the diode at 31.25 magnifications has been reduced for printing purposes. Nevertheless, components are clearly defined.

■ *Send leasing information . . . plus . . . catalogs containing complete details on:*

- ☐ Ram Type Universal Turret Lathes
- ☐ Saddle Type Universal Turret Lathes
- ☐ Hydraulic Tracing Attachment
- ☐ Auto Threader
- ☐ Automatic Turret Lathes
- ☐ Numerical Tape Control Turret Lathes
- ☐ Numerical Tape Control Positioning Table
- ☐ "Avoidable Costs" Replacement Formula
- ☐ Optical Comparators

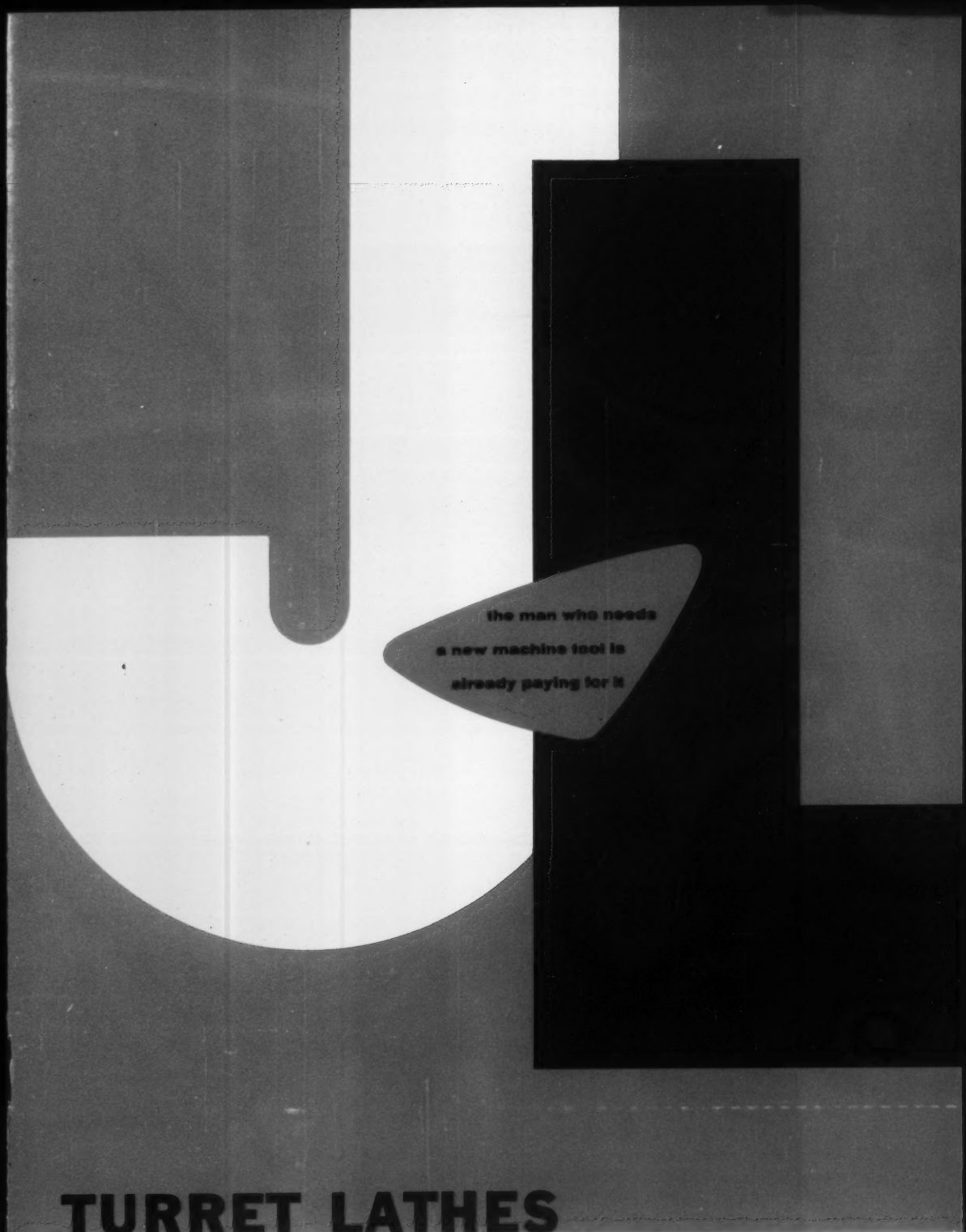
NAME.....

TITLE.....

COMPANY.....

STREET.....

CITY.....ZONE.....STATE.....



TURRET LATHES

AUTOMATIC • STANDARD • TAPE CONTROL
all from

JONES & LAMSON MACHINE COMPANY

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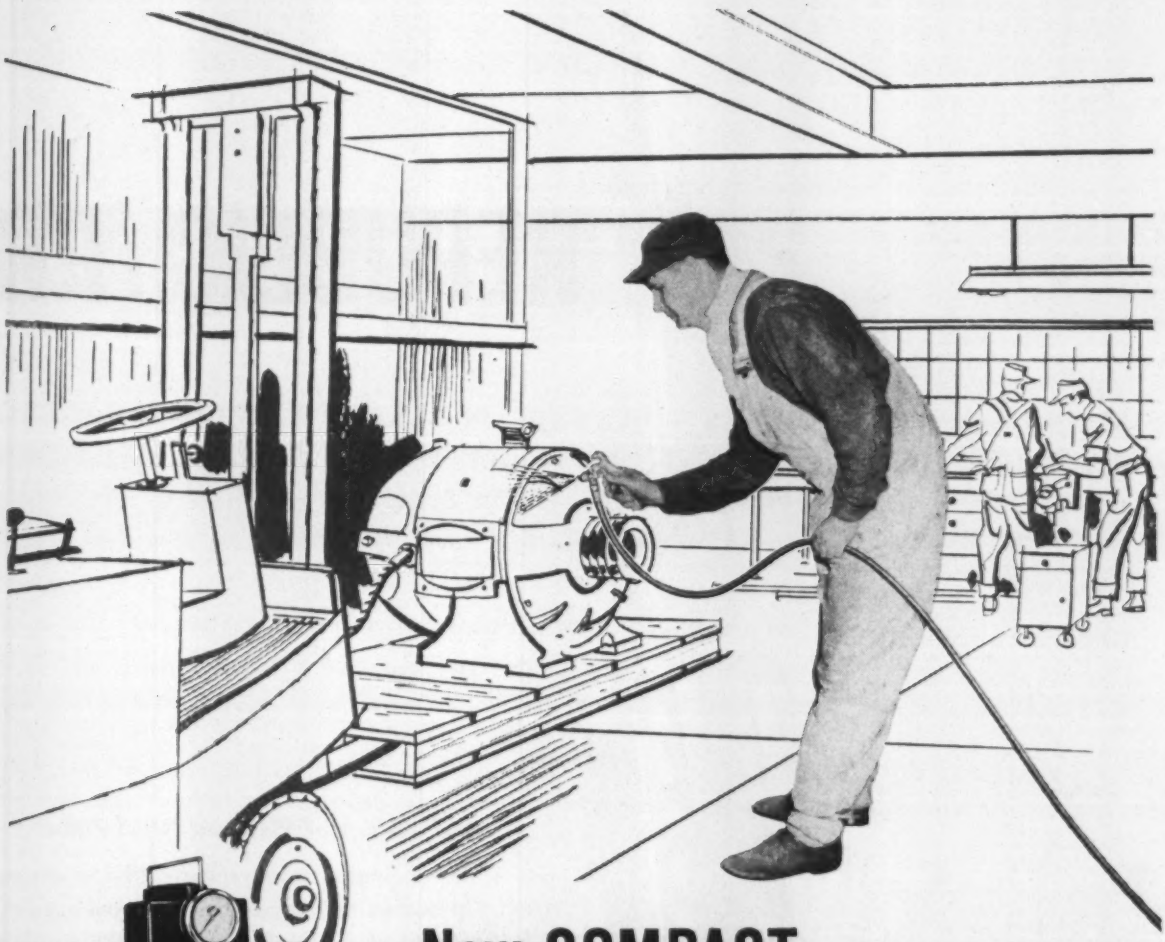

New COMPACT airless spraying outfit

...an "extra" man for your maintenance department

New, economy model airless outfit . . . small enough to carry anywhere in the plant . . . large enough for a variety of maintenance jobs. Apply paint with minimum overspray, maximum coverage . . . paint goes on the surface where you want it, not into the air. Result: considerable savings in time and materials.

All metal surfaces of the airless outfit, exposed to spraying materials, are tough, non-corrosive stainless steel . . . ideal for indoor or outdoor use.

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Ask about our spray painting school. Open to all . . . NO TUITION . . . covers all phases.

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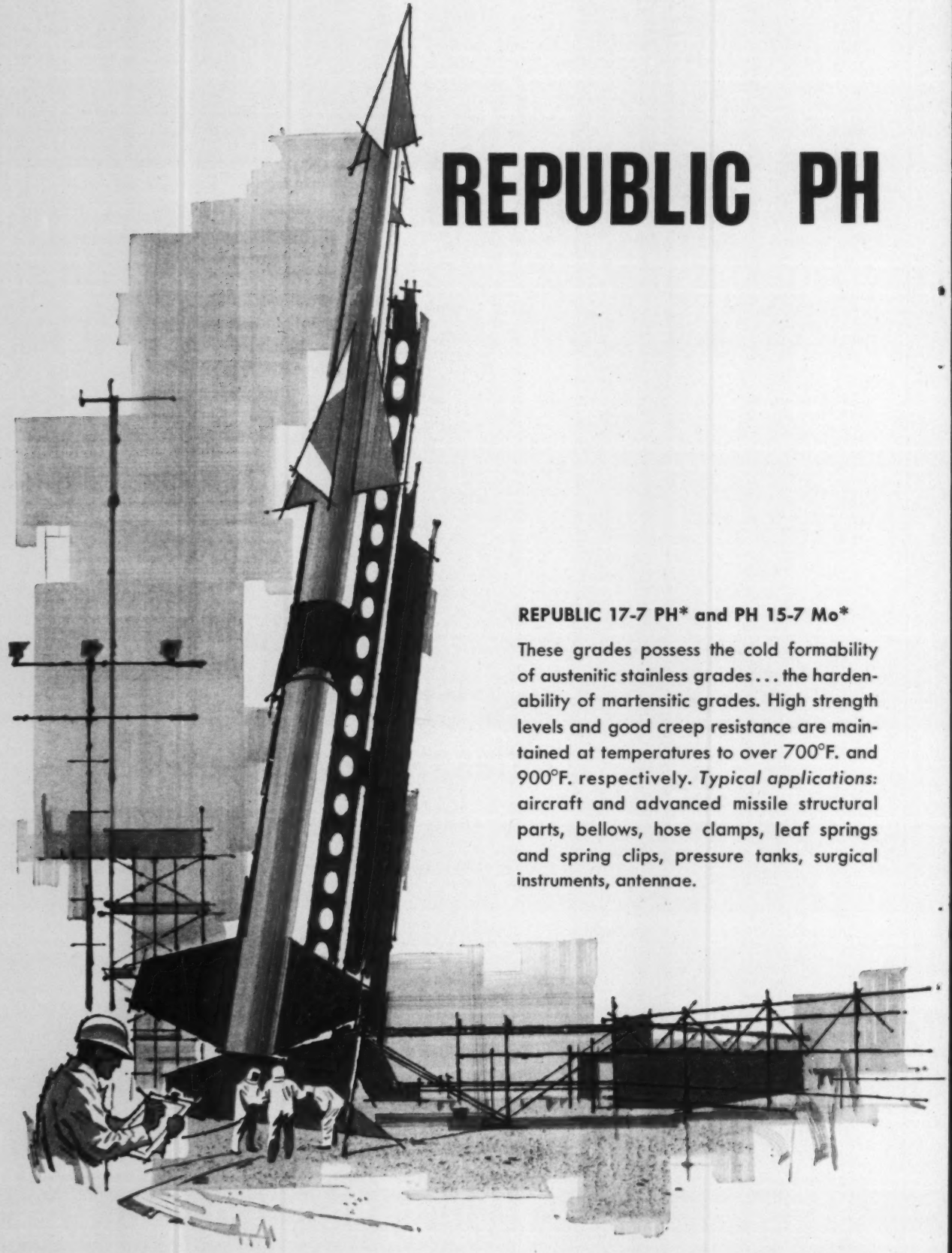
REPUBLIC PH



REPUBLIC 17-7 PH* and PH 15-7 Mo*

These grades possess the cold formability of austenitic stainless grades . . . the hardenability of martensitic grades. High strength levels and good creep resistance are maintained at temperatures to over 700°F. and 900°F. respectively. *Typical applications:* aircraft and advanced missile structural parts, bellows, hose clamps, leaf springs and spring clips, pressure tanks, surgical instruments, antennae.

STAINLESS STEELS

BECAUSE THEY OFFER GREATER VERSATILITY, precipitation hardenable stainless steels broaden the already wide field of stainless steel applicability . . . Republic PH Stainless Steels available in the standard mill products effectively reduce fabricating costs. Higher developed strengths —*which remain high at elevated temperatures*— are coupled with the formability and corrosion-resistance of other stainless grades. Mail coupon for data.

REPUBLIC 17-4 PH*

Simple heat treatment after fabrication develops high strength levels without excessive distortion or scaling. Unlike most martensitic chromium types, Republic 17-4 PH* is welded without preheating or post annealing, thus resulting in lower fabricating costs. *Typical applications:* bearings, bolts, shafts, aircraft fittings, gears, splines, mandrels, pins, seats, and valves.

REPUBLIC A-286

In addition to excellent corrosion-resistance, this grade is designed to afford elevated temperature creep and stress rupture strength to over 1200°F. Because it is used on critical applications, majority of tonnage produced is processed from ingots that have been vacuum melted by Republic's consumable electrode process. *Typical applications:* jet engine and gas turbine components such as wheels, blades, frames, housings, afterburners, tail cone parts, and fasteners.

**Licensed under Pat. Nos. 2482096, 2505763 and Trade Mark of Licensor.*

REPUBLIC STEEL

Cleveland 1, Ohio

Where Steels are Made to Meet the Challenge of Acceleration

Strong, Modern, Dependable

REPUBLIC STEEL CORPORATION
DEPT. ST-1262
1441 REPUBLIC BUILDING • CLEVELAND 1, OHIO

Please send more information on:

☐ Republic 17-7 PH and PH 15-7 Mo
☐ Republic 17-4 PH ☐ Republic A-286

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Company _____

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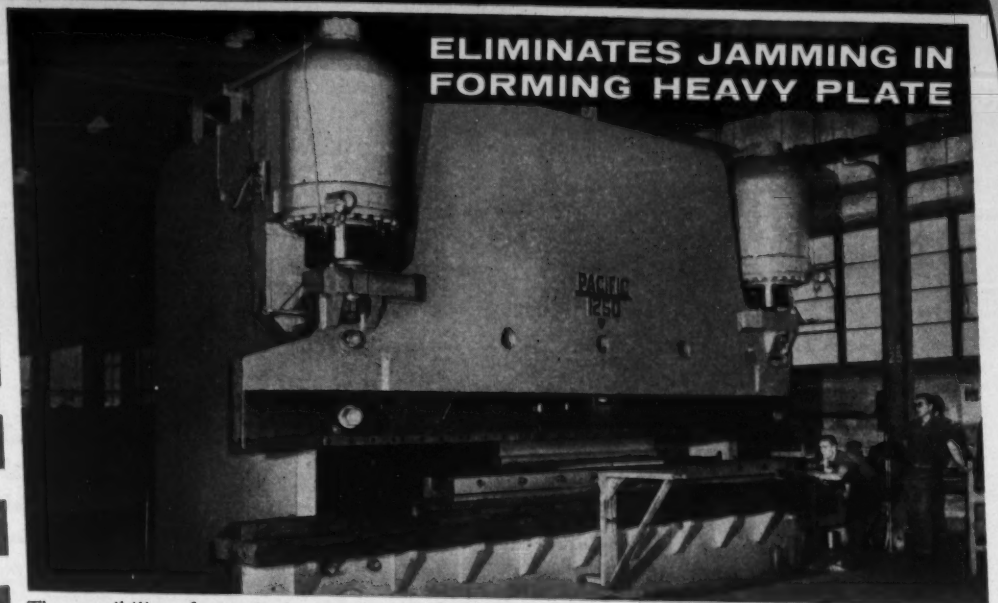
City_____ Zone____ State_____

15 years engineering and millions of dollars invested* to perfect the world's finest brake... today's PACIFIC HYDRAULIC PRESS BRAKE

Over 9 out of every 10 hydraulic press brakes in operation today are PACIFIC providing...

- More dependability
- Freedom of maintenance and leakage
- Simpler electric controls
- Simpler hydraulic control
- More accuracy in level control
- More accuracy in air bending
- More operating convenience
- Greater visibility
- More rigidity in cylinder construction
- Shock-free hydraulic system suitable for punching



The possibility of press brake jamming in forming heavy plate is eliminated at Clark Equipment Co., Construction Machinery Division, Benton Harbor, Michigan, by use of a PACIFIC hydraulic press brake. On overload resulting from normal variations in thicknesses of mill stock and in forming unknown alloys, the PACIFIC hydraulic ram eases up and does not continue to bottom of stroke. This avoids jamming and permanent damage that is unavoidable with machines required to complete each stroke. Maximum tonnage available throughout the full stroke permits use of deep dies in forming 1½" cold rolled and man-ten high strength steel. Brake maintains .010" accuracy from one end of 20 foot long pieces to the other. Pieces can be formed by eye with minimum setup.

*THIS INVESTMENT ENABLED PACIFIC TO INTRODUCE:

- Tape control to synchronize cylinders within .003" (1947)
- Cushioned punching (1949)
- Precision depth control to repeat accuracy within .001" (1951)
- Manual turret stroke controls for progressive bending (1952)
- Selective anti-whip speeds to eliminate reverse bends (1952)
- Tandem operation of press brakes for forming pieces 40 ft. or longer (1953)
- Tonnage control to protect light dies in heavy press (1953)
- Multiple hydraulic cushion cylinders for deep drawing (1954)
- Overhead integral power unit for increased accuracy (1955)
- Cylinder ram guides for increased rigidity (1956)
- Shearing attachment for shearing heavy plate on press brake (1958)
- Pipeless stacking of valves to eliminate pipe breakage and leakage (1959)
- Shockless hydraulic valving to eliminate cause of leakage (1959)

PACIFIC PRESSES AND SHEARS

PACIFIC INDUSTRIAL MFG. CO., OAKLAND, CALIF. • PACIFIC PRESS AND SHEAR CORP., MT. CARMEL, ILL.

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KEYSTONE WIRE...

long life "backbone" for gasoline hose...

Electric Hose & Rubber Co., Wilmington, Delaware, world's largest hose manufacturer, reinforces their Delmar gasoline pump hose with Keystone Drawn Galvanized MB Spring Wire to prevent kinking and collapse and to resist corrosion. This high quality wire and rayon cord are circularly woven around an inner hose lining . . . automatic horizontal woven hose machines do the job. The outside cover is extruded over the carcass and the final product vulcanized.

Keystone Drawn Galvanized MB Wire with its close diameter tolerance, uniform temper throughout the coil and special zinc coating has been developed to work perfectly in the highly automated machines of Electric Hose & Rubber Co. Regular galvanized wire just won't work.

Just as Keystone Wire Specialists successfully produced this high carbon quality wire that has proved so satisfactory for Electric Hose & Rubber Co., they would like the challenge of developing a wire to improve upon your present wire product. See your Keystone Representative soon; he will be pleased to discuss your wire problems.

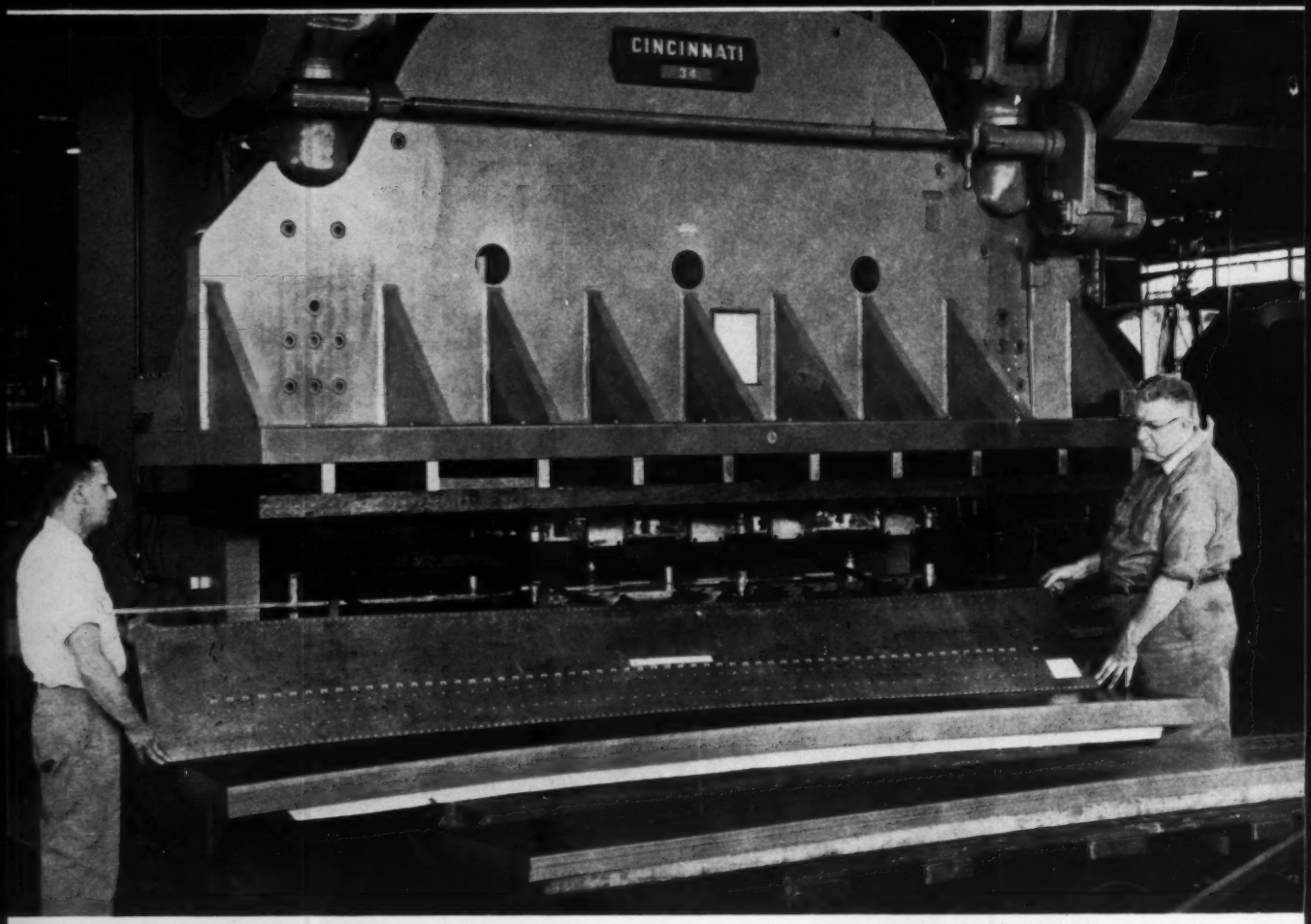
Keystone Steel & Wire Company, Peoria, Illinois

KEYSTONE

WIRE FOR INDUSTRY

MANUFACTURED AT PEORIA, ILLINOIS, U. S. A.

CINCINNATI® PRESS BRAKE
cuts press work costs



Courtesy Dahlstrom Manufacturing Corporation, Jamestown, N. Y.

For half the initial cost of a conventional press with equal die area and tonnage, the Dahlstrom Manufacturing Corporation does its press work on a Cincinnati Press Brake with widened bed and ram.

Its low first cost has been followed by other savings, too. For example, setup and operation are easy and fast because the die area is out in front of the housings. Floor-to-floor time per piece is half what it was with previous production methods. Cincinnati accuracy holds .005" tolerances between holes.

Dahlstrom uses the full versatility of the Cincinnati Press Brake for shallow draw work, blanking, notching, and punching. Ask our representative to show you how to earn similar savings in your shop.

Shapers / Shears / Press Brakes

THE CINCINNATI SHAPER CO.

Cincinnati 11, Ohio, U.S.A.

United Kingdom: The Cincinnati Shaper Co., Ltd., Glasgow, Scotland

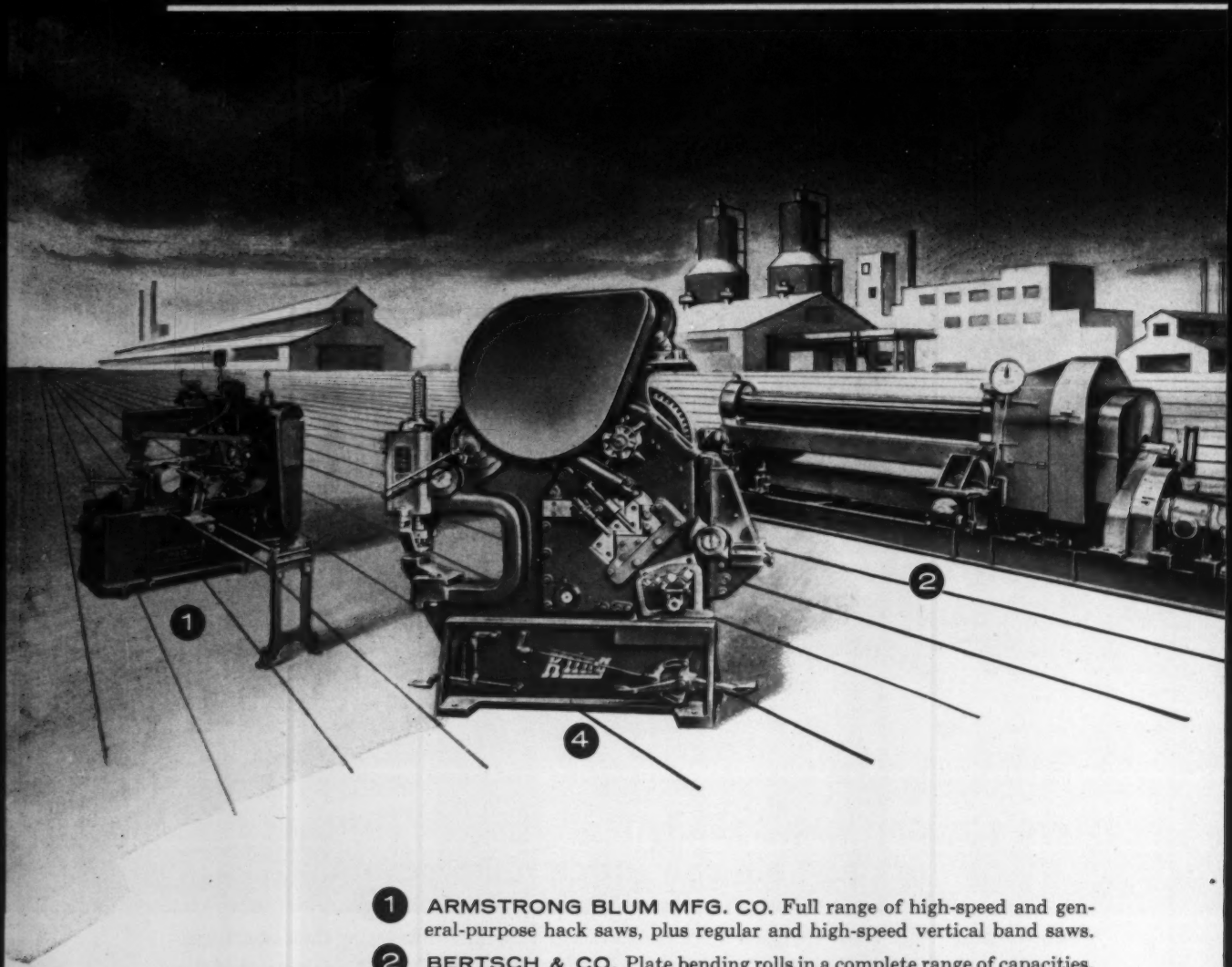
Here's a man who's ready to help you with a roll problem

But you don't need to have a roll problem to have a visit from Bill Curran, General Manager at National Roll. To the contrary, the "boss" spends a lot of his time with customers discussing their operations and roll requirements before problems have an opportunity to develop. This is typical of the personal interest National takes in helping customers get the benefits of maximum roll performance. For personal attention to *your* roll requirements, whether steel, iron or nodular iron, order from National. You'll see why . . . NATIONAL'S THE GROWING NAME IN ROLLS.

NATIONAL ROLL & FOUNDRY DIVISION
GENERAL STEEL CASTINGS CORPORATION, Avonmore, Pennsylvania
General Steel Castings Corporation, General Offices: Granite City, Ill. Plants: Granite City, Ill., Eddystone, Pa., Avonmore, Pa.
Subsidiary: St. Louis Car Company, St. Louis, Mo.

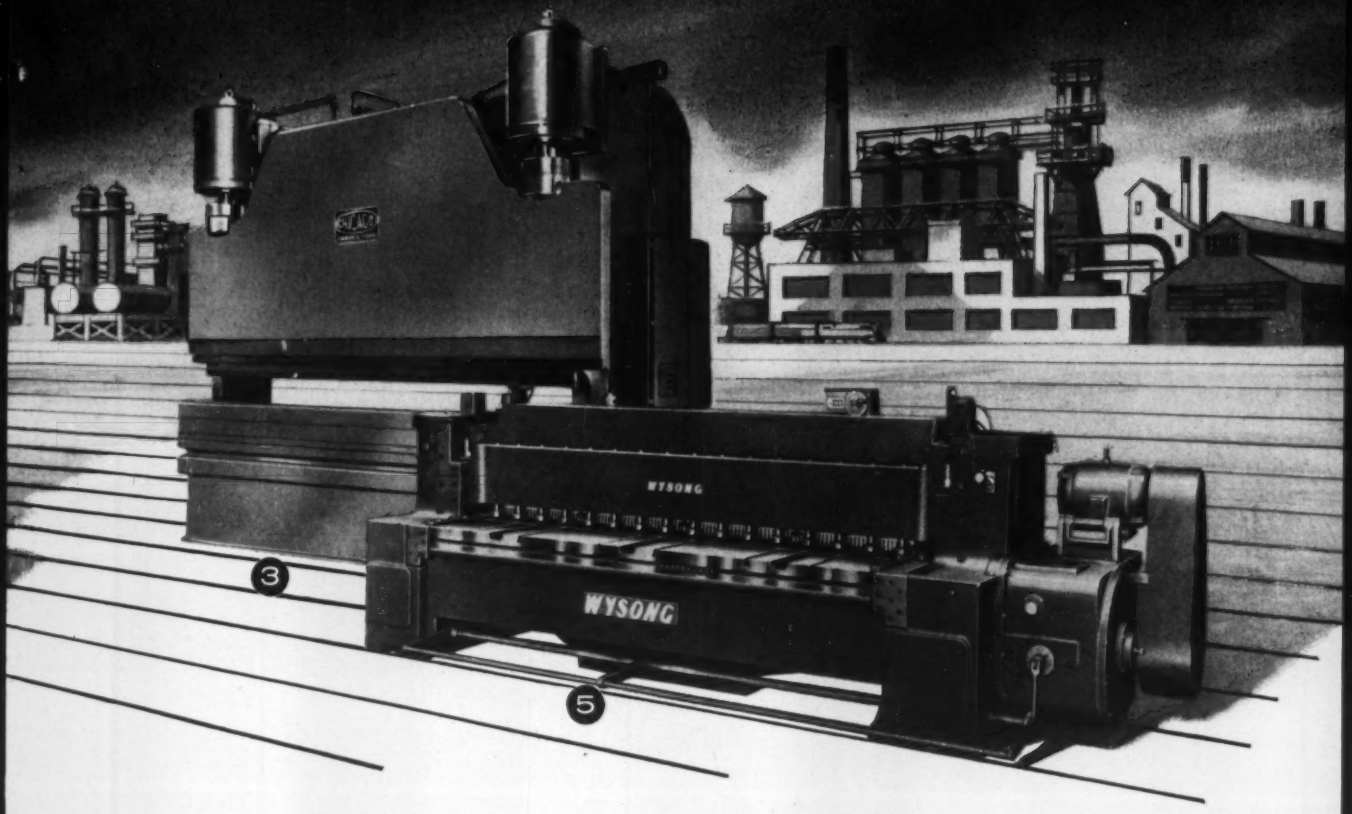
5 REASONS WHY RYERSON IS . . . .

your most complete source



1. **ARMSTRONG BLUM MFG. CO.** Full range of high-speed and general-purpose hack saws, plus regular and high-speed vertical band saws.
2. **BERTSCH & CO.** Plate bending rolls in a complete range of capacities, and overdriven squaring shears for material from 10 gauge to 1¼" thick. Also straightening rolls and culvert-making machines.
3. **DREIS & KRUMP MFG. CO.** Mechanical and hydraulic press brakes from 11- to 2000-ton capacity. Also full line of hand and power apron brakes, straight side presses, and special bending machines.
4. **KLING DIVISION, HILL ACME CO.** Famous for its combination shear-punch and coper, and for a complete line of punches, bar and angle shears, rotary shears, friction saws, bar and angle rolls, bulldozers and structural mills.
5. **WYSONG AND MILES CO.** Underdriven squaring shears for material from 18 gauge to ½" thick, also sheet metal rolls.

for metalworking machinery



No other single supplier of machinery for metal fabrication can offer you the range of types and models available from Ryerson. So, with no other supplier can you be so sure of getting exactly the right machine to do each fabricating job best at lowest cost.

We represent nearly 100 manufacturers, each a recognized leader in its field. The five featured on these pages represent five good reasons why it will pay you to call in a Ryerson representative when you're considering a machinery purchase. His recommendations are backed by Ryerson experience gained in supplying metal *and* the machinery to fabricate it for over a century.

Our complete line includes equipment for bending, braking, forming, hoisting, drilling, pressing, punching, rolling, sawing, shearing, threading and welding.

RYERSON METALOGICS

JOSEPH T. RYERSON & SON, INC., MEMBER OF THE INLAND STEEL FAMILY

STEEL · ALUMINUM · PLASTICS · METALWORKING MACHINERY

precise tubing

In a wide selection of seamless and welded and drawn up to 1" O. D.

- Stainless Steel . . . Nickel . . . Nickel Alloys . . . Super and Exotic Alloys
- Glass-to-Metal Sealing Alloys
- Clad Metals and
- Composite Wires . . . Base and Precious Metals

Write for Bulletin No. 12

BISHOP

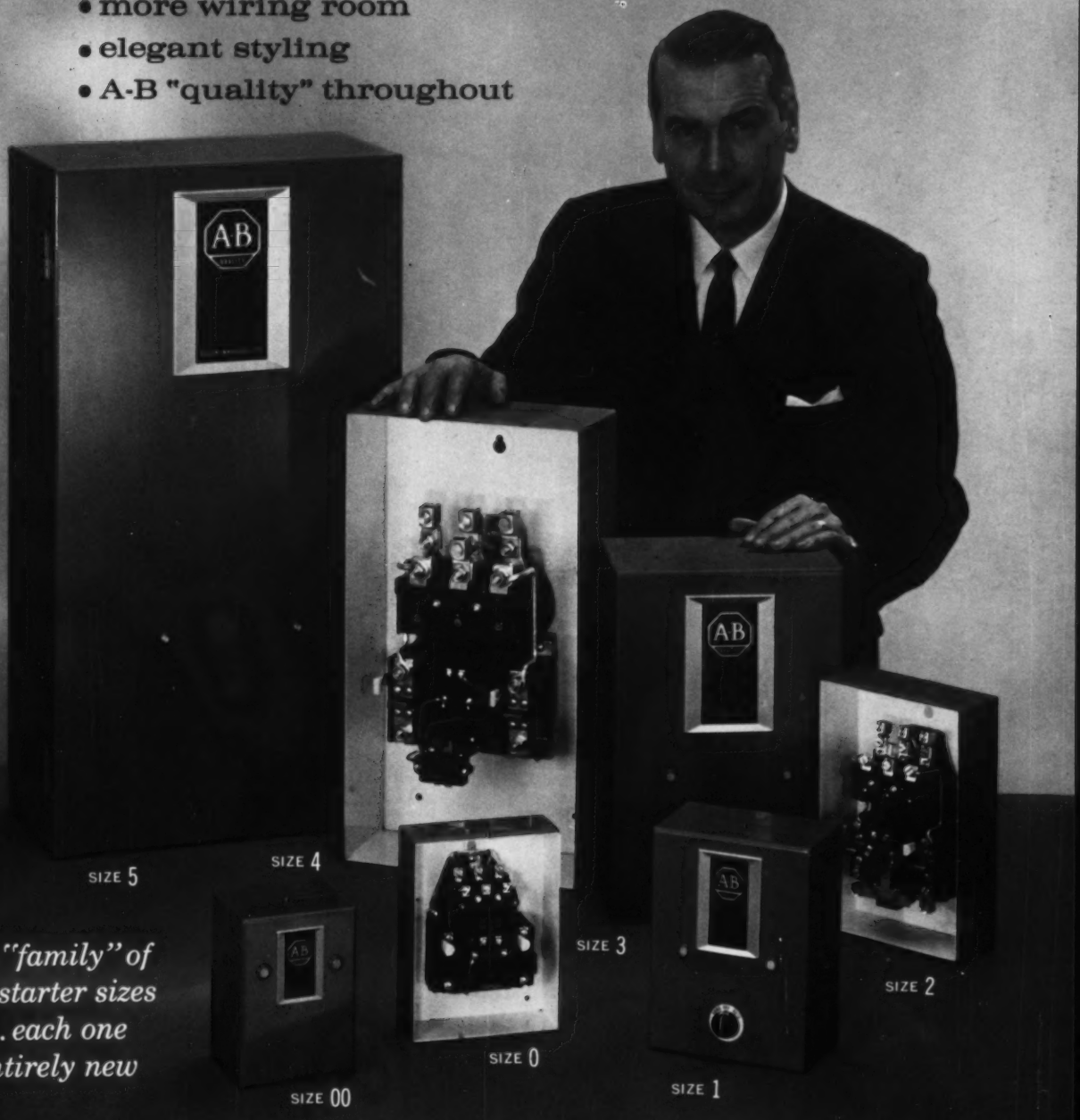
Tubular Products Division **J. BISHOP & CO.** *platinum works* 30 KING STREET, MALVERN, PENNA.

A JOHNSON MATTHEY ASSOCIATE "METALS FOR PRECISION AND PERFORMANCE"

OFFICES: NEW YORK • CHICAGO • ATLANTA • HOUSTON • LOS ANGELES

a new line of Bulletin 709 motor starters by ALLEN-BRADLEY

- smaller size
- greater interrupting capacity
- even more millions of trouble free operations
- more wiring room
- elegant styling
- A-B "quality" throughout



A "family" of 7 starter sizes ... each one entirely new

greatest advance in motor control in 30 years

In appearance . . . in performance . . . in physical size and weight . . . these Allen-Bradley Bulletin 709 solenoid starters are *completely new in every way!*

NEW COMPACTNESS. Size reductions are so drastic you'll hardly believe your eyes. The tables below will give you some idea of how the new line of Bulletin 709 starters compares with the old.

A TREMENDOUS INCREASE IN LIFE—both mechanical and electrical. All of these new starters are good for many more millions of trouble free operations.

NEW PATENTED MAGNET. For its weight and size, the most powerful magnet used on motor control. Its short, cushioned stroke assures long contact life. A new, permanent air gap prevents any possibility of magnetic sticking. "Snap action" guarantees positive contact opening and closing.

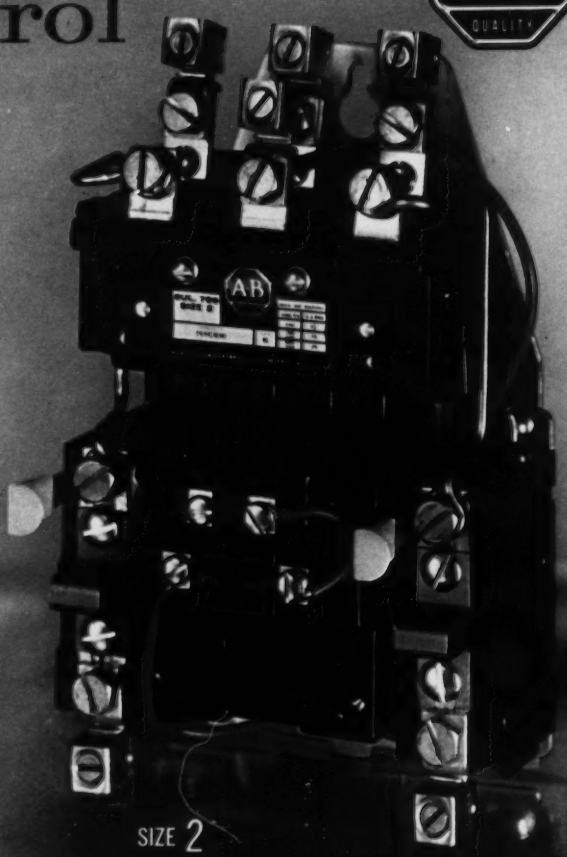
NEW MOLDED COIL. Impervious to atmospheres that could cause trouble, and also protected against mechanical damage. All coils are easily removed—from the front of the starter.

NEW CONTACTS. New double break contacts of cadmium oxide silver resist welding . . . close and seat firmly without sliding or wear-causing motion.

NEW OVERLOAD RELAYS. Not only "trip-free" but also "tamperproof," to reliably protect motor and machines. Of course the new relays were designed to use the old Bulletin 709 heating elements which you have in stock.

NEW ENCLOSURES. Completely restyled by Brooks Stevens—and so modern. They are a sales asset on any type of modern machine or industrial installation.

BETTER WRITE FOR MORE INFORMATION ON THIS REVOLUTIONARY NEW BULLETIN 709 STARTER!

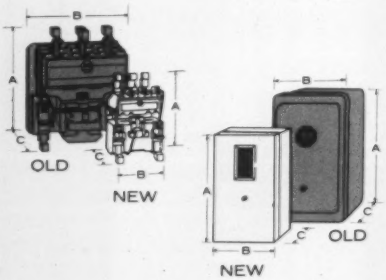


New Bulletin 709 Solenoid Motor Starter

CHECK THE "NEW" WITH THE "OLD" BULLETIN 709 DIMENSIONS

The wiring room in the new enclosures will delight the electrician.

Starter Size	OPEN TYPE STARTERS					
	NEW			OLD		
	Height A	Width B	Depth C	Height A	Width B	Depth C
00	3⅝	3⅞	3¹⁵⁄₁₆	—	—	—
0	5⅞	4¹⁄₁₆	3¹¹⁄₁₆	5⅝	4¾	3¼
1	6⅝	4½	3¹¹⁄₁₆	5⅞	5	3¼
2	7¾	4⅝	3¹¹⁄₁₆	10¹⁄₁₆	5¾	4⅞
3	10¼	6¼	5⅞	12⅝	7¼	5⅞
4	11⅞	7⅜	6¼	16¼	12⅝	6¹³⁄₁₆
5	14¹³⁄₁₆	9	6½	20	16⅜	8¼



Starter Size	NEMA 1 ENCLOSURES					
	NEW			OLD		
	Height A	Width B	Depth C	Height A	Width B	Depth C
00	7⅝	4⅞	4¼	—	—	—
0	9⅛	6¹⁄₁₆	4⅜	7⅞	5⅜	4¼
1	10	6¹³⁄₁₆	4⅜	8¹³⁄₁₆	6⅜	4¼
2	12	7⅝	4⅜	14½	9	5⅜
3	16⅝	10⅜	7	19½	11⅜	6¹³⁄₁₆
4	22	11⅝	8	26¹⁄₁₆	14¹³⁄₁₆	7¹³⁄₁₆
5	32¹³⁄₁₆	17¹³⁄₁₆	9⅞	41½	19¹³⁄₁₆	13¹³⁄₁₆

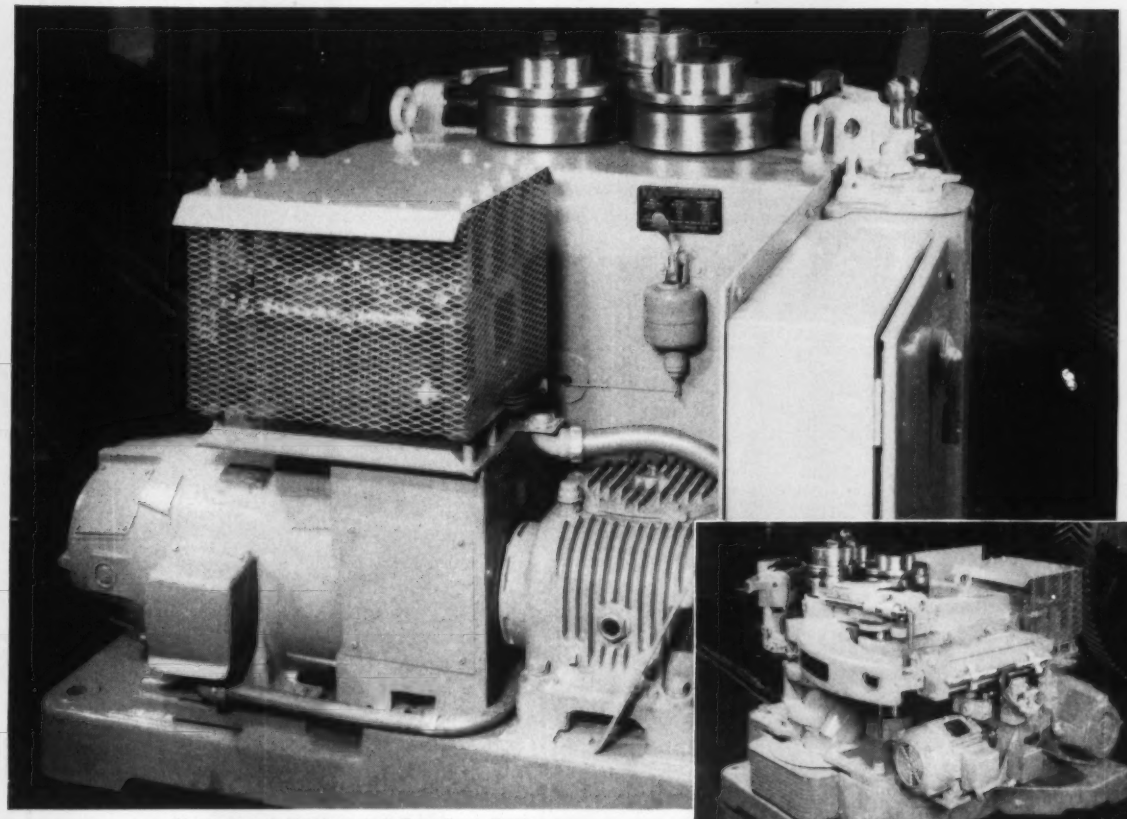
8-61-RM

ALLEN-BRADLEY

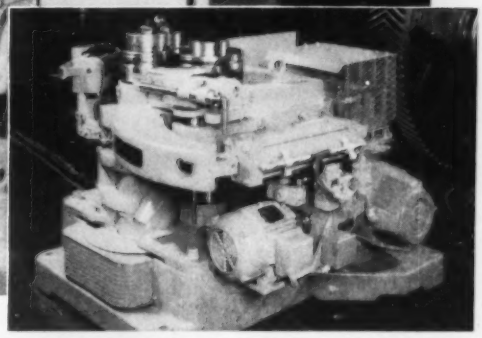
Member of NEMA

Quality Motor Control

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wisconsin



New No. 1 Horizontal Bending Roll



Note Hydraulic Roll Adjustment

SPEED DIE-LESS COLD METAL BENDING WITH IMPROVED 'BUFFALO' BENDING ROLLS

- *Fast* Production Bending of Circles, Arcs and Spirals to Commercial Accuracy.
- *Hydraulic* Roll Adjustment Speeds Setup Time.
- *New,* Compact Design Saves Valuable Floor Space.
- *Handle* Angles, Rounds, Squares, Tubes, Pipes, Flats and Special Shapes.
- *Easily* Changed Rolls Eliminate Need for Expensive Dies.
- *Models* and Sizes to Handle All Types of Work.

Improved 'Buffalo' Bending Rolls are engineered for peak accuracy. Rugged construction insures long, trouble-free life. Optional attachments available.

See how 'Buffalo' Bending Rolls can save you production and maintenance time and money. For complete facts, contact your 'Buffalo' machine tool dealer or write the factory direct.

ESTABLISHED 1877 "Buffalo" MEMBER N.M.T.B.A.

MACHINE TOOL DIVISION

BUFFALO FORGE COMPANY

Buffalo, New York

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

'Buffalo' Air Handling Equipment to move, heat, cool, dehumidify and clean air and other gases.

'Buffalo' Machine Tools to drill, punch, shear, bend, slit, notch and cope for production or plant maintenance.

'Buffalo' Centrifugal Pumps to handle most liquids and slurries under a variety of conditions.

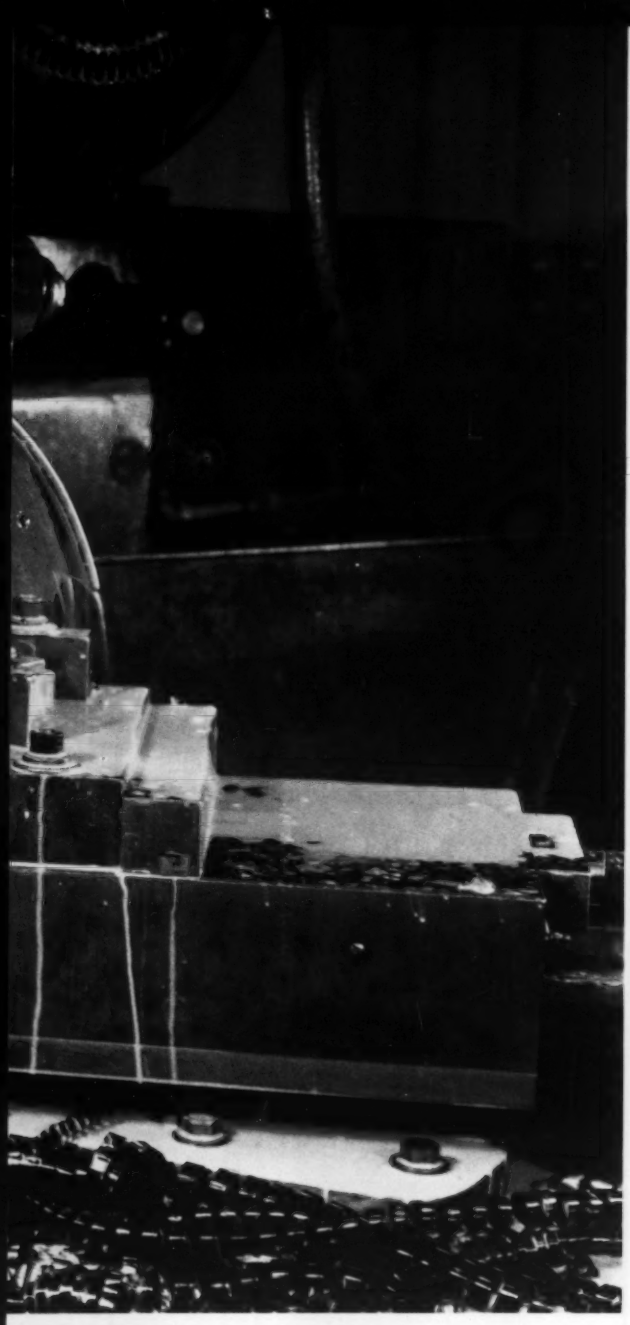
Squier Machinery to process sugar cane, coffee and rice. Special processing machinery for chemicals.

Chicago Pneumatic Tool eliminates rust, with Gulfcut® Heavy Duty Soluble Oil . . .

Previously, the Oil Tool Division of Chicago Pneumatic Tool Co. used chemical coolants in a variety of machining operations. But recently, this Fort Worth division switched to a heavy duty emulsifying cutting fluid—Gulfcut Heavy Duty Soluble Oil.

The reason: a rust problem that just wouldn't quit! "Any coolant tends to work into machine operating parts," says Donald Rial, General Foreman. "The trick is to use a coolant with effective anti-rust properties. Then, if the coolant does contaminate gearbox lubricating oil, the gears are protected against rust. Otherwise, an ugly layer of rust forms on tableways and in operating parts.

"However, we haven't had one bit of trouble since the changeover. Although we use a mixture ratio of one part oil to twenty parts water, the anti-rust inhibitor is so completely effective that rust has been eliminated, and yet the emulsion provides the neces-



Profile gage. Height is very critical. It's held to within .005 inches. Note the blanks at left—machined cones at right.

Kenneth Snyder, left, Plant Superintendent, shows Frank Mauro, Gulf Sales Engineer, Chicago Pneumatic's Jet bit. The company also makes Regular and Slant bits.

Grooving a cone for rock drill bit. The coolant: Gulfcut Heavy Duty Soluble Oil. Each cone is AISI 4815 steel. It takes 2½ minutes to groove one cone. Speed: 284 rpm. Feed: .0045 ipr.

improves tool life

GULF MAKES THINGS RUN BETTER!

sary cooling and lubrication for good tool life."

"We make and sell rock drill bits," says Kenneth Snyder, Plant Superintendent. "In this competitive business, we need every advantage to maintain an economic production rate. Gulfcut Heavy Duty Soluble Oil has helped improve tool life and reduce maintenance costs—and that's most important to us."

If you've got a machining problem, remember to try the Gulfcut line. You'll soon see how Gulf makes things run better! Call a Gulf Sales Engineer at your nearest Gulf office. Or write for detailed booklet.

GULF OIL CORPORATION
Dept. DM, Gulf Building
Houston 2, Texas

GULF

"3M" TYPE "C" DISCS CUT GRINDING TIME 1/3!

At a 3M representative's suggestion, Mastercraft Metals, Inc., Bellevue, Ky., a leading manufacturer of stainless steel kitchen equipment recently switched from a competitive brand to 3M Type "C" Discs for grinding welds. The result: a ⅓ reduction in grinding time . . . and Type "C" Discs produce a finer scratch pattern that allows easier, faster blending to the final finish.

COST CHECK 5-4-5

Why not let 3M's new COST CHECK 5-4-5 Program help you to effectively investigate ways to lower costs and increase profits. Discover . . .

- If your grinding can be done more economically
- If your finishing is as efficient as possible
- If your polishing can be done faster and better

Send today for a free COST CHECK 5-4-5 Review Form without obligation. Put 3M's years of abrasive know-how at your disposal. Write: 3M Company, 900 Bush Ave., St. Paul 6, Minn. Dept. No. ABH-31.

3MAGINATION in GRINDING and FINISHING

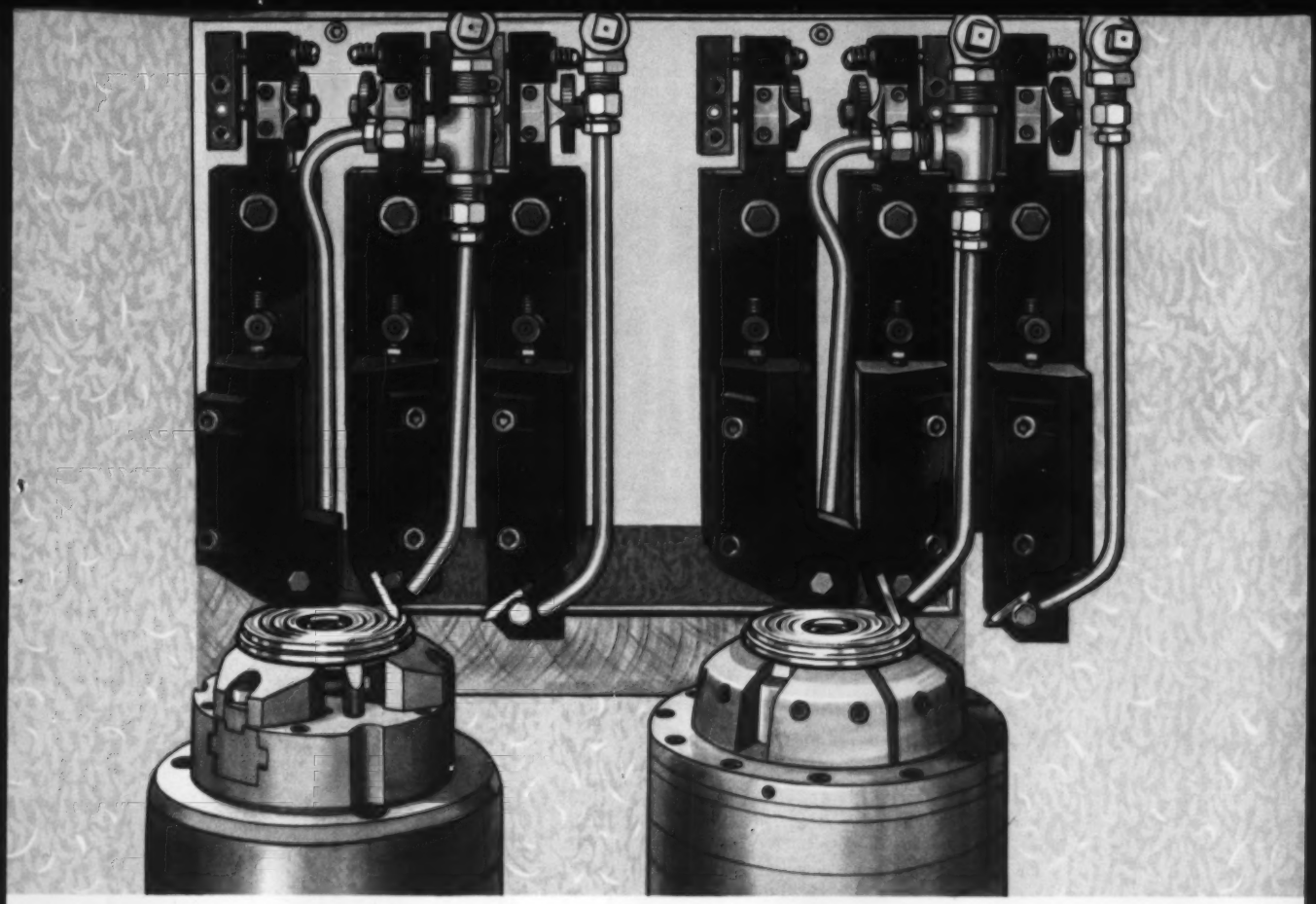
COATED ABRASIVES DIVISION

"3M" IS A REGISTERED TRADEMARK OF 3M CO., ST. PAUL 6, MINN.

MINNESOTA MINING AND MANUFACTURING COMPANY

. . . WHERE RESEARCH IS THE KEY TO TOMORROW

3M COMPANY



New Britain's new concept for contour turning and boring

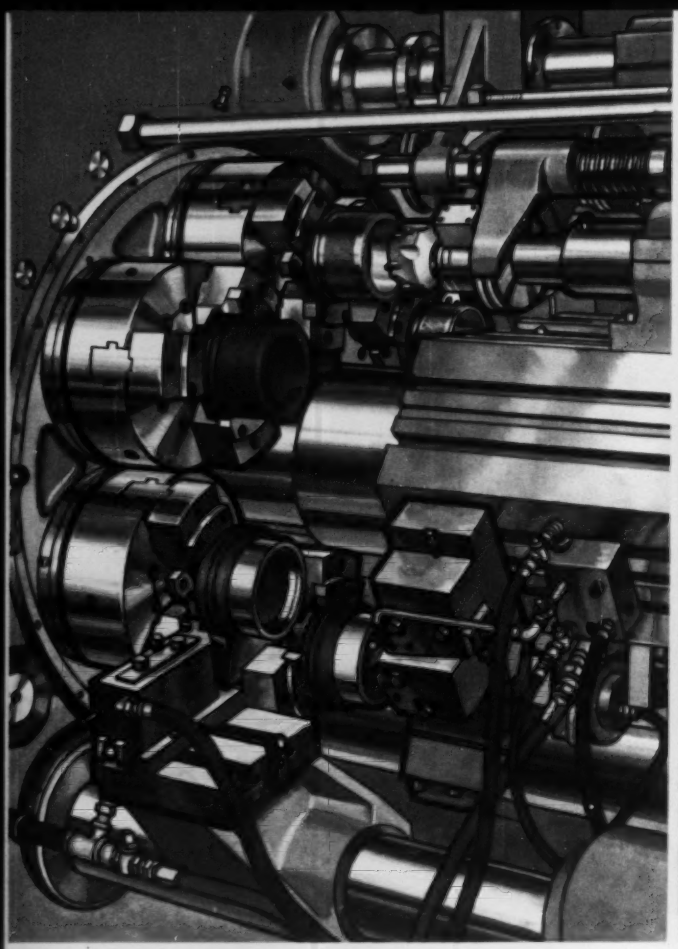
Beyond a certain point, continued refinement of existing designs in machine tools ceases to make an appreciable contribution to performance. Thus in designing our New Series of Vertical Precision Boring Machines, we have incorporated several completely new design concepts to provide improved performance and greatly increase over-all usefulness.

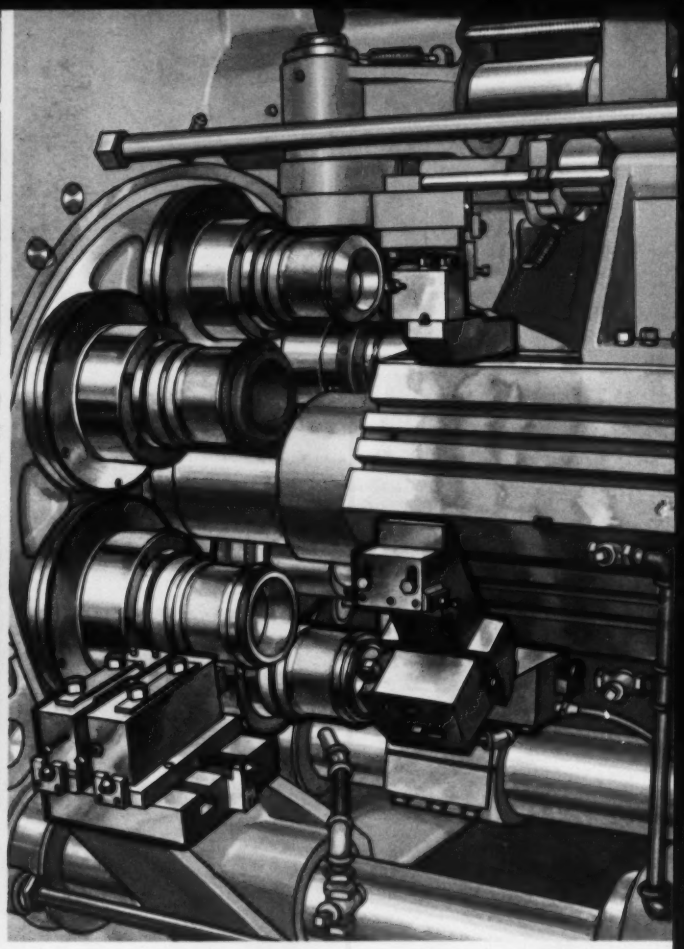
For the first time machines of this type can be used as building block units. Their clean-sided design permits any number of self-contained machines, each with one or more spindles, to be arranged side by side and operated as a single unit. They also may be operated with equal efficiency as individual machines. Parts can be inverted on adjacent machines or on adjacent spindles of the same machine.

In order to take the fullest advantage of the precision inherent in cam control, long linkages between cams and slides have been eliminated. A pair of cams is mounted on a common shaft which is carried *within the vertical slide*. Since all slide actuating forces are contained in the vertical slide, both cams are directly adjacent to the slides they control and no outside forces are imposed on the slide ways. The result is maximum rigidity for heavy cuts coupled with extreme accuracy for close tolerance work.

This unique and eminently workable approach to contour turning and boring results in the highest order of accuracy on even the most complex pieces. Your New Britain Representative can give you details on the nine different models available in this series. For catalog material, write The New Britain Machine Company, New Britain-Gridley Machine Division, New Britain, Conn.

THE NEW BRITAIN MACHINE COMPANY
New Britain-Gridley Machine Division - New Britain, Connecticut





New Britain . . . still the best Chucker you can buy

We're not unhappy about the fact that for years, in many plants, the name New Britain has been synonymous with chuckers. New Britain Chuckers have turned out literally millions of pieces of work for practically every major industry in the world. This is less important to the prospective buyer of one of these machines, however, than the capabilities of these machines today. How do they stack up against other chuckers or even other types of machines capable of doing similar work? Pretty well, we think.

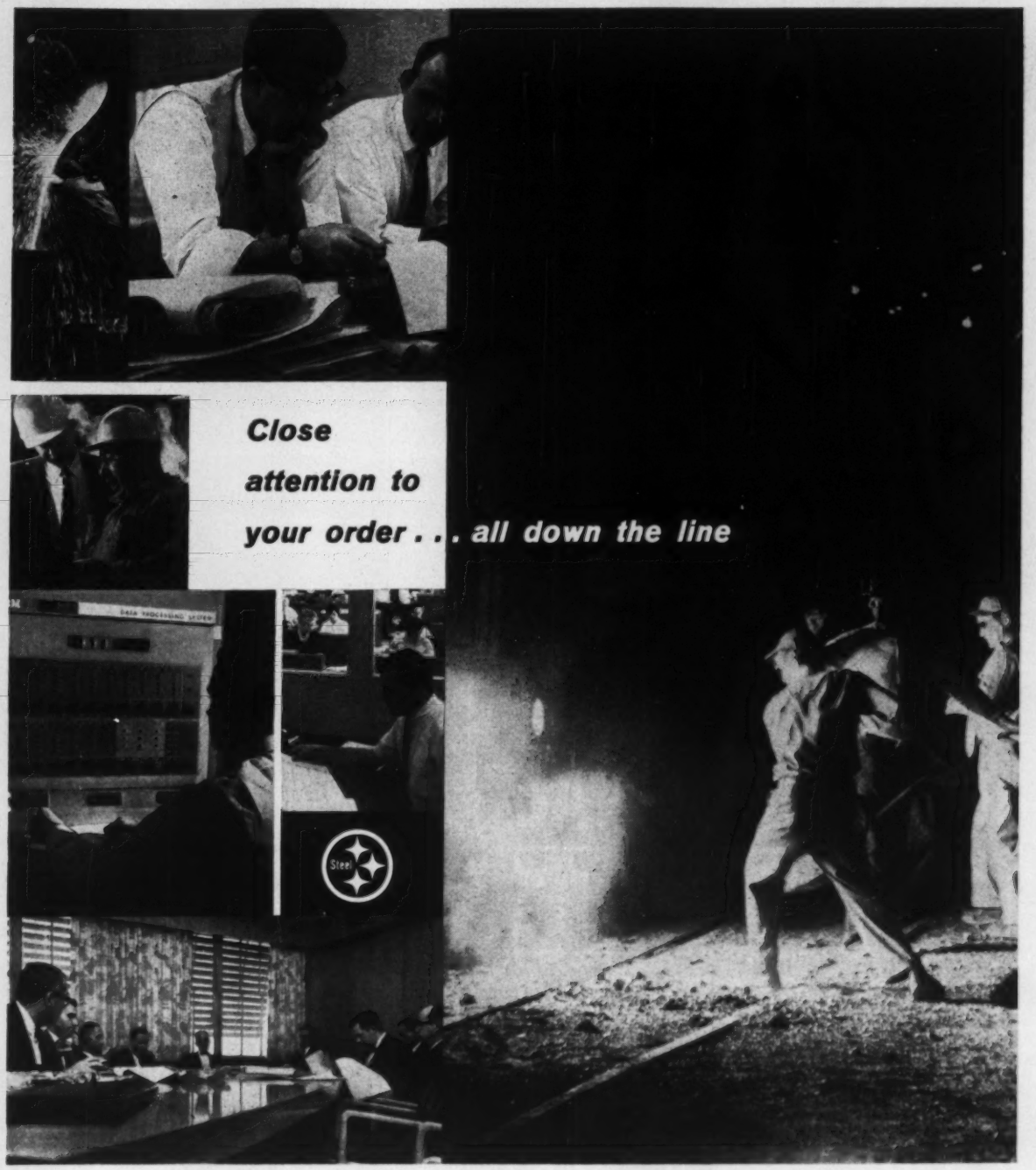
New Britain's open-end design still can't be beat for unlimited accessibility to the tooling area. This same wide-open feature makes it doubly more practical to adapt these machines to automatic loading and unloading.

The unusual combination of longitudinal and transverse forming motions is another unbeatable New Britain feature. The massive forming arms on New Britain Chuckers allow heavier cuts and cuts of much greater complexity. This ability to do more work can eliminate the need for second operation machines in many instances. For really complex work, two chuckers set up side by side, as shown here, each doing one side of the piece, can smooth the way for high production. Less complicated work can be set up to perform both sides of the same piece on a single machine.

These massive machines provide the tooling combinations, spindle speeds and power to perform the widest possible variety of work. Their basic design will stay new for years to come, continuing to provide profitable operation. You may know New Britain Chuckers, but you may not be fully aware of the improved series presently being offered. Why not call your New Britain Representative or contact us at The New Britain Machine Company, New Britain-Gridley Machine Division, New Britain, Connecticut.

THE NEW BRITAIN MACHINE COMPANY

New Britain-Gridley Machine Division - New Britain, Connecticut

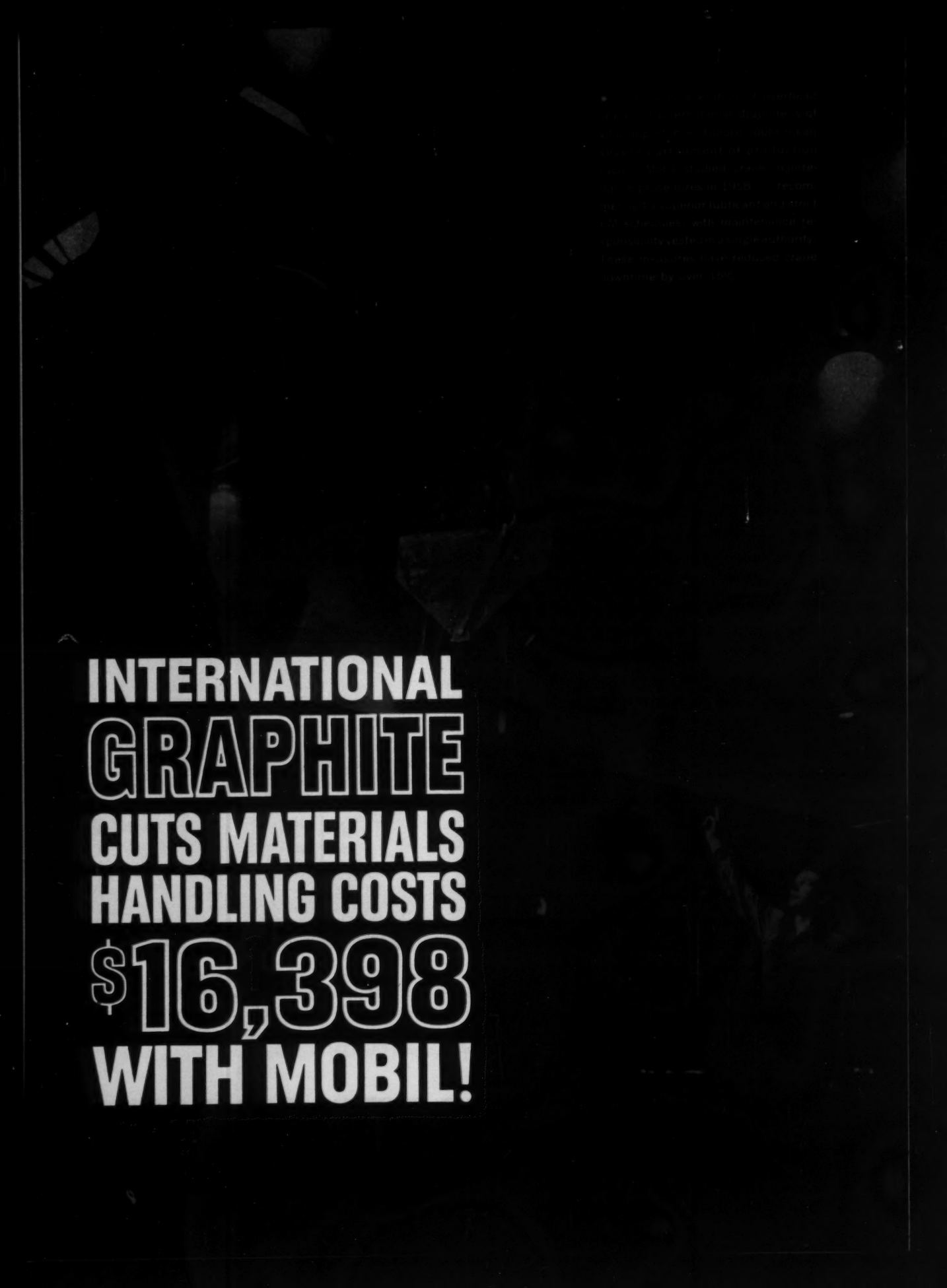


Alan Wood is just the right size to give your order and requirements the close attention of Alan Wood's skilled steel-men . . . all down the line. You get the advantage of young creative thinking tempered by 135 years of solid experience. Alan Wood's fully integrated operation cuts red tape, gives you uniform quality in plate, sheet and strip . . . consistently . . . and ON TIME.

***that's your advantage at* ALAN WOOD STEEL COMPANY**

Conshohocken, Pa. • STEEL PRODUCERS WITH THE CUSTOMER IN MIND

DISTRICT OFFICES AND REPRESENTATIVES: Philadelphia • New York • Los Angeles • Boston • Atlanta
Cincinnati • Cleveland • Detroit • Houston • Pittsburgh • Richmond • St. Paul • San Francisco • Seattle
Montreal, Toronto and Vancouver, Canada: A. C. Leslie & Co., Limited


INTERNATIONAL
GRAPHITE
CUTS MATERIALS
HANDLING COSTS
$16,398
WITH MOBIL!

• In addition to direct savings through use of premium oils and greases, there have been immediate and long-term cost reductions through greater engine efficiency and driver training. Gasoline savings have been particularly impressive. Despite increased plant activity, International Graphite has achieved a 30 month total savings in lower gasoline costs of over $5,692.

• For vehicular materials handling units, Mobil made these recommendations: installation of hour meters; proper use of premium lubricants; servicing on a 50-operating-hour basis (about 2 weeks) rather than on a rigid once-a-week schedule. Air cleaners better suited to the conditions of operation were installed. As a result, scheduled servicings have been reduced by an average of 633 annually. In the past 30 months cost of oil, grease and labor have been reduced $8,206.

• International Graphite's Maintenance Superintendent, Mr. Mel Price, center, reports that there have been substantial savings, too, in the area of motor overhaul. Prior to changes recommended by Mobil in 1958, complete motor overhauls averaged 9 a year on 25 vehicles. During the last 30 months, this has been reduced to an average of 7 a year. Resultant savings in reduced labor and parts costs have amounted to $2,500.

• For over 20 years, Mobil has helped reduce costs for the International Graphite and Electrode Division of Speer Carbon Company, Niagara Falls, New York, a major producer of such finished graphite products as anodes, electrodes, and molds, as well as specialties for the railroad, chemical and munitions industries.

International Graphite faces exceptionally severe maintenance problems because of highly unusual conditions at the plant. Abrasive particles of carbon, sharp sand and silicon-carbide find their way into all types of materials handling equipment, necessitating a heavy schedule of preventive maintenance. By recommending superior lubricants and improved PM techniques, Mobil Engineers have helped International Graphite effect an additional $16,398 reduction in costs of maintaining and operating this equipment during the past 30 months.

Consistently over the years, Mobil has *proved* its value to industry. To learn how Mobil may help you, call your nearest Mobil Representative. Or write, Mobil Oil Company, 150 East 42nd St., New York 17, N. Y.

Mobil

STEELWELD PRESS BRAKES

Hydraulic and Mechanical

WHATEVER your requirements, there is a Steelweld Press Brake —hydraulic or mechanical—to best serve your needs. Available in all sizes to 2000 tons. For plate thicknesses to 2". For lengths to 30'-0".

Each type of machine, mechanical or hydraulic, has its particular advantages. The work to be performed is the determining factor for most satisfactory machine selection.

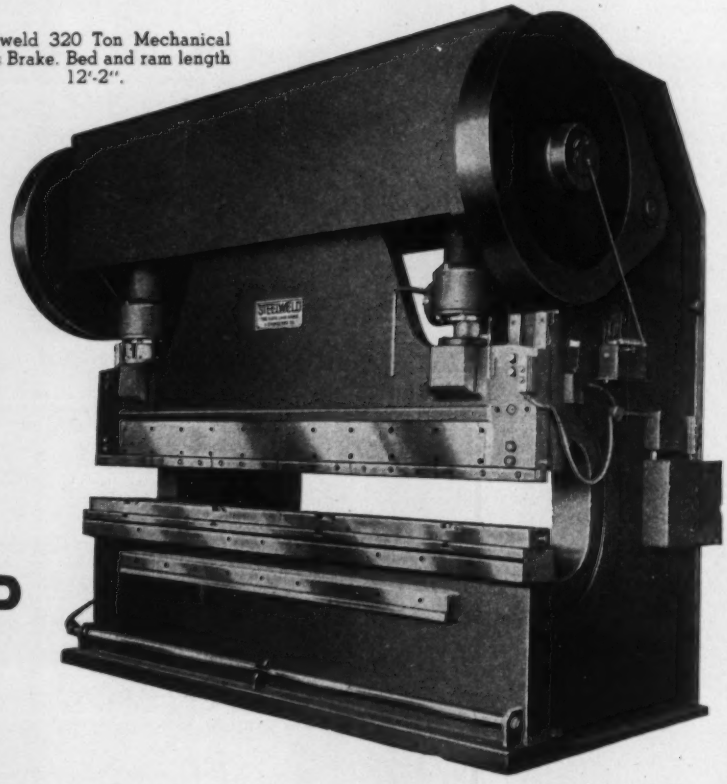
As a manufacturer of both types of press brakes, we are in a position to offer you either one without partiality. Therefore, we urge you to get the complete story, the Steelweld story, when considering the purchase of a new brake. Ask for free catalogs.

Steelweld 400 Ton Hydraulic Press Brake. Bed and ram length 14'-0".

Hydraulic Press Brakes
Catalog No. 2024

Steelweld 320 Ton Mechanical Press Brake. Bed and ram length 12'-2".

Mechanical Press Brakes
Catalog No. 2023



STEELWELD
Mechanical and Hydraulic
PRESS BRAKES

STEELWELD MACHINERY DIVISION • THE CLEVELAND CRANE & ENGINEERING CO. • 7875 E. 281 ST. • WICKLIFFE, OHIO

STEELMAKING AT JESSOP

Listen...

5...4...3...2...1...0...Lift Off!

The countdown is on.

Scientists and skilled technicians scan their instruments, alert to the least sign of malfunction.

Liquid oxygen has been piped into the fuel chamber of the gleaming Atlas ICBM poised on the launching pad. Other last-minute preparations are completed. Tension mounts. It won't be long. Listen . . .

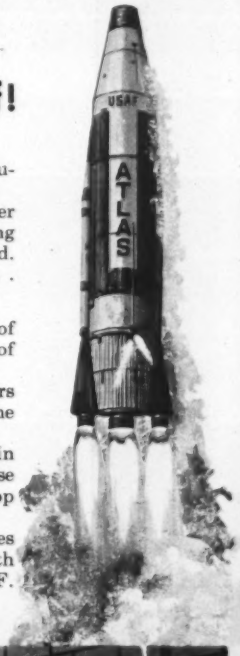
5...4...3...2...1...0...*Lift Off!*

The missile comes to life in a swirling cloud of vapor, exhaust and flame. The engine—capable of 360,000 pounds of thrust—roars thunderously.

Airborne now, the Atlas gathers speed and soars majestically on its predetermined course down the Atlantic range—a successful launching.

Jessop Steel Company makes several alloys used in the Atlas—steels forged and machined into precise but rugged mechanisms. And you will find Jessop steel in the launching pad "plumbing" too.

Swepco Tube Corporation of Clifton, N. J., makes piping for LOX systems that fuel the Atlas with liquid oxygen at temperatures of –300° F. to –320° F. *That's* punishment for any metal.



But Swepco's austenitic chromium nickel Rock-Forged pipe can take it. Ductility—to avoid fracture by reason of brittleness—is an all-important factor in this application.

With a value of about 38 foot pounds by Charpy Impact Test, the piping supplied by Swepco handles the job with ease—with an added measure of safety against costly breakdown.

Swepco buys steel from Jessop for rock-forging. Why? Because through controlled chemistry and certain production techniques, Jessop and Swepco developed a steel second to none in workability in the cold forging process.

In making steel like this, experience counts . . . and Jessop has it. Call any of Jessop's 23 sales offices in North America and let us prove it to you.

Plants and Service Centers:
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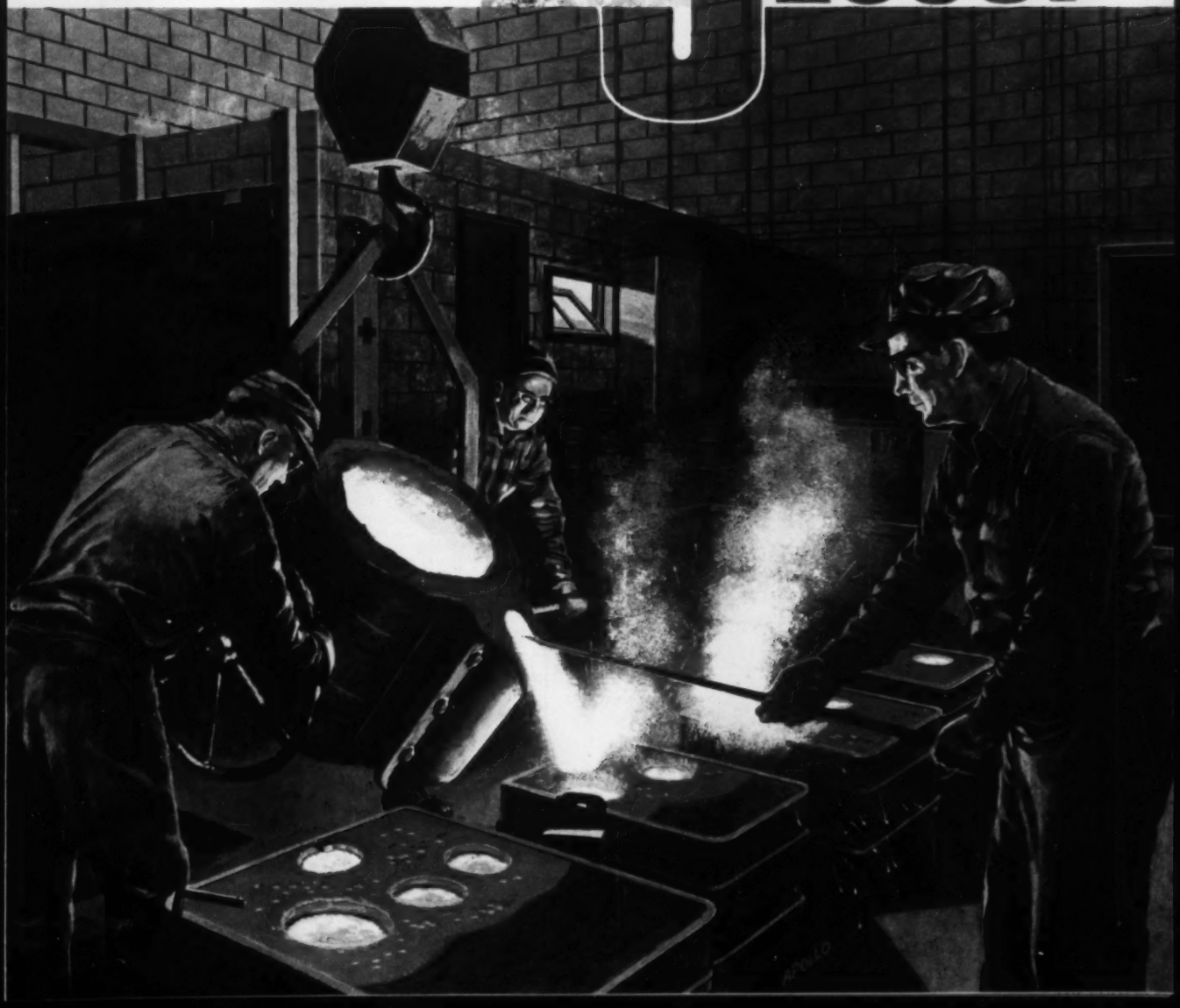
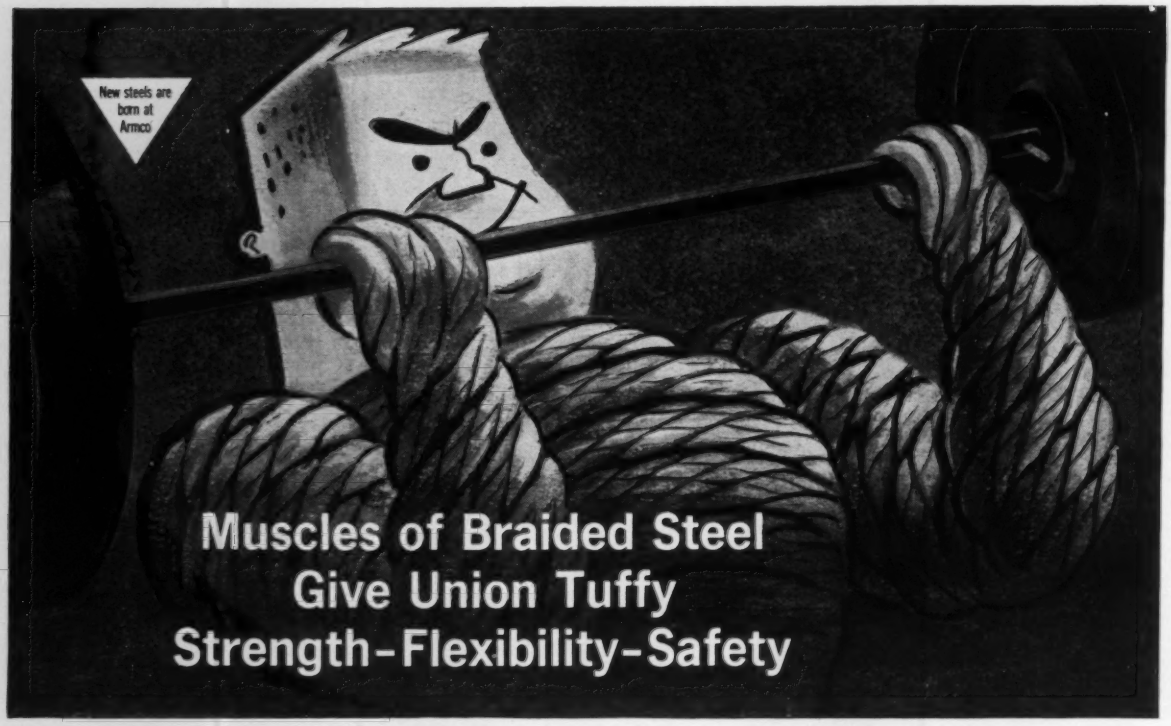
JESSOP





Taking their cue from nature's arrangement of muscles, Union technicians perfected Union Tuffy Slings with a machine-braided wire fabric construction. The result —muscles of braided steel, so strong, so flexible they perform far beyond the ability of ordinary wire rope. So, for balanced power, safety and dependability, insist on the balanced team of Union Tuffy Slings and Union Wire Rope Tuffy Hoist Lines.

Four Other Union Wire Slings Help You Fill Any Need

In addition to famed Union Tuffy Slings, Union Wire Rope offers, in a full range of sizes:

1. **Hand Braided** six and eight-part slings.
2. **Uni-ply**—a flexible multi-part rope laid sling with pressed-on metal ferrule.
3. **Press-Grip** wire rope sling with pressed-on metal ferrule.
4. **Uni-Grip** wire rope sling with return loop splice and pressed-on metal ferrule.

Union Wire Rope **Tuffy Tips** on safe use of Slings and Hoist Lines

Hoists vs. Hernia

Proper hoists cost less than hospitalization. A manufacturer said recently 75% of his compensation claims were connected with hernia. The Ohio Bureau of Workmen's Compensation estimated the average hernia claim at $750. Said a safety magazine: ("Hoists) with proper attention will help substantially in reducing back injuries and hernia claims by reducing the strain on workers."

Free! Two Valuable Tuffy Handbooks

1. "Tuffy Tips." Gives many other safety hints. Tells how to break in and properly use wire ropes and slings. Chock-full of do's and don'ts to save money, assure better service.

2. "Tuffy Sling Handbook." Helpful data on the selection and use of slings —types, dimensions, weights, fittings, rated loads, safety-approved signals.

Write Union Wire Rope, Armco Steel Corporation, 2160 Manchester Ave., Kansas City 26, Missouri.

ARMCO **Union Wire Rope**

Columbia-Geneva Steel Line showing the exit end looping tower.

• Three Annealing Lines by Aetna-Standard Division of Blaw-Knox have been installed in these divisions of United States Steel Corporation—Tennessee Coal and Iron at Fairfield, Alabama; United States Steel at Gary, Indiana; and Columbia-Geneva Steel, Pittsburg, California. The lines have many design features to improve tension control and tracking. High furnace speeds result in better production, quality and yield. A free loop before and after the furnace makes strip tension control much more accurate. At the entry and exit ends, loop towers provide abundant strip storage to insure constant furnace speeds. Scrap handling at the entry end has been improved. The lines handle coils up to 36,000 pounds, 72″ maximum diameter and 38″ maximum width. Maximum line speed—1500 f.p.m. For information write Aetna-Standard Division, Blaw-Knox Company, 300 Sixth Avenue, Pittsburgh 22, Penna.

Aetna-Standard Division

BLAW-KNOX

Are You Getting All That You Are Paying For When You Buy Cold Finished Steel Bars?

STANDARDS YOU CAN FOLLOW TO ASSURE BUYING THE BEST WITHOUT PAYING A PREMIUM

All cold finished steel bars are manufactured to industry standards.

But what you don't receive when you order just any cold finished steel bar are the *extra quality features* you get only in Bliss & Laughlin bars. You can *see* the difference . . . you can *work* the difference . . . you can *have* the difference *at no extra cost.*

These quality features can be important in a number of ways:

PATENTED LUSTERIZED® FINISH

Lusterized finish means that the bar is cleaner, brighter, free from processing grit, lime and oils.

Because of this freedom from contaminants, machining costs are reduced, collet mechanisms are less likely to jam, and tool life is longer. If plating is required, preparation time is substantially lower. The surface can often be used for finished components without machining.

The patented, exclusive process, applied to all Bliss & Laughlin cold finished bars, is a development of Bliss & Laughlin research.

CLOSE TOLERANCES

The industry's closer tolerance standards, adopted several years ago, were also a development of Bliss & Laughlin pioneering work in improving manufacturing processes and procedures.

Long before they became industry standards, these closer tolerances were routinely followed by Bliss & Laughlin. You can therefore expect these close tolerances to be consistently maintained in all Bliss & Laughlin production.

SPECIAL SOIL-FREE COATING

After a protective layer of rust-inhibiting material is deposited on the bar during the Lusterizing process, a special, exclusive, transparent protective oil is added. This special coating repells contaminants and moisture during shipping and storage. It doesn't soil hands as do other protective coatings.

Bliss & Laughlin Lusterized bars are cleaner to handle, cleaner to work, and can be stored for longer periods without fear of rust and contamination from airborne material.

FAST, NATION-WIDE SERVICE

You can purchase Lusterized cold finished steel bars in mill quantities directly from strategically located Bliss & Laughlin mills across America or from steel service centers everywhere.

Available in rounds, squares, hexagons, flats and special sections, Lusterized bars are furnished in carbon and alloy steels. Either can be leaded.

MACHINABILITY AND METALLURGICAL SERVICE

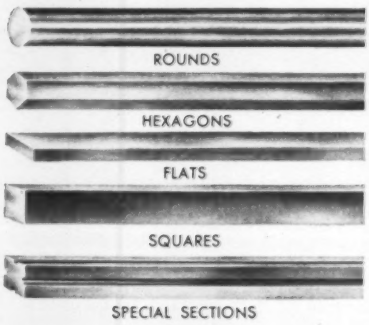
Take full advantage of Bliss & Laughlin's extensive research and development work on the machinability and metallurgy of cold finished steel bars. This service costs nothing and can mean more profits.

UNQUESTIONED DEPENDABILITY

For 70 years, Bliss & Laughlin has devoted its energies to producing only one line of products—cold finished steel bars. America's leading specialist, with the industry's most complete and most flexible mill service, Bliss & Laughlin concentrates its substantial resources and nation-wide facilities on serving customers well and dependably.

* * * * *

These are the standards you can follow when you wish to buy the best cold finished bar, without paying premium prices. Why settle for less? Simply specify Bliss & Laughlin *Lusterized* cold finished steel bars the next time you order or inquire.



These additional quality features are available only in BLISS & LAUGHLIN LUSTERIZED COLD FINISHED STEEL BARS

Specialists in Finish, Accuracy, Straightness, Strength and Machinability

BLISS & LAUGHLIN

GENERAL OFFICES: Harvey, Ill. • MILLS: Harvey, Detroit, Buffalo, Los Angeles, Seattle, Mansfield, Mass.

Leading Independent Producer of Cold Finished Steel Bars

cool · tough

DASCO SUPER SOLUBLE BASE

water-mix cutting fluid

Under adverse conditions—on jobs too difficult for regular water-mix cutting fluids, yet not suited for straight petroleum oils—Stuart's Dasco Super-Soluble Base will improve performance and profits, reduce costs.

Here is a water-mix cutting fluid with a sulfochlorinated fatty oil base that assures proper chip formation, prevents welding, and reduces heat-generating friction under extreme circumstances. It is a heavy-duty soluble oil that permits machining of stainless, low carbon steels, monel, and jet engine alloys with economical tool life and fine surface finish.

Even at slow cutting speeds, the chemically active extreme pressure additive in Dasco Super-Soluble provides antiweld protection at the tool-chip interface—prevents edge build-up and cratering of tools.

Dasco Super-Soluble gives you high lubricity, antiwear, and antiweld qualities, plus the high cooling capacity inherent in a water-mix cutting fluid. It is ideal for heavy-duty turret lathe work, high-speed turning with carbides, tough form milling, boring, and surface or round-hole broaching. Use it at 40 to 1 for turning, drilling, milling, boring, sawing, and reaming—15 to 1 for broaching.

Stuart

here comes real detergency

Stuart's new Hi-D

transparent metalworking compound

Hybrid compound keeps grinding wheels open and free-cutting, minimizes machine tool maintenance.

Now, today, there is a metalworking compound that offers extra-high detergency for stress-free grinding, yet does not attack paint, remove way lubricant, or leave crystalline deposits on the machine . . . that lubricates as it cleans, yet does not leave an oil film on the chuck . . . that is just as clear as any synthetic compound, yet is a petrochemical-type solution that is effective and stable at 60:1.

Hi-D is one of the outstanding lubrication developments in Stuart's 90-year history. Yet, it costs less per drum than most "coolants"—up to ⅓ less at proper dilution than some high-priced cutting fluids.

No other cutting and grinding compound is anything like it. Best described as a hybrid, it has all the qualities you look for in a synthetic without any of the disadvantages.

Stuart

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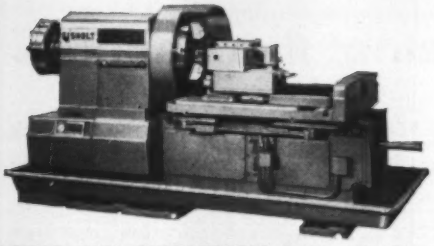


MASTERLINE® SIMPLIMATIC Automatic Chucking Lathe—Here's the essence of the "building block" principle: standard headstock and wide, screw-fed platen; standard front, center, rear or auxiliary slides with tool blocks—positioned to handle maximum surfaces per chucking. Add accessories to suit the work—a tailstock, boring bar speeder, single- or multiple-pass JETracer®, back-facing or back-boring attachments for simultaneous front and back machining. Literally, there's no end to *your* opportunities for saving.

Have you considered using a standard "building block" type lathe for jobs now calling for "special" machines? Others have!

Don't buy that "special" before you investigate the Gisholt Simplimatic®. You may save money and precious lead time with the flexibility this *standard* lathe offers.

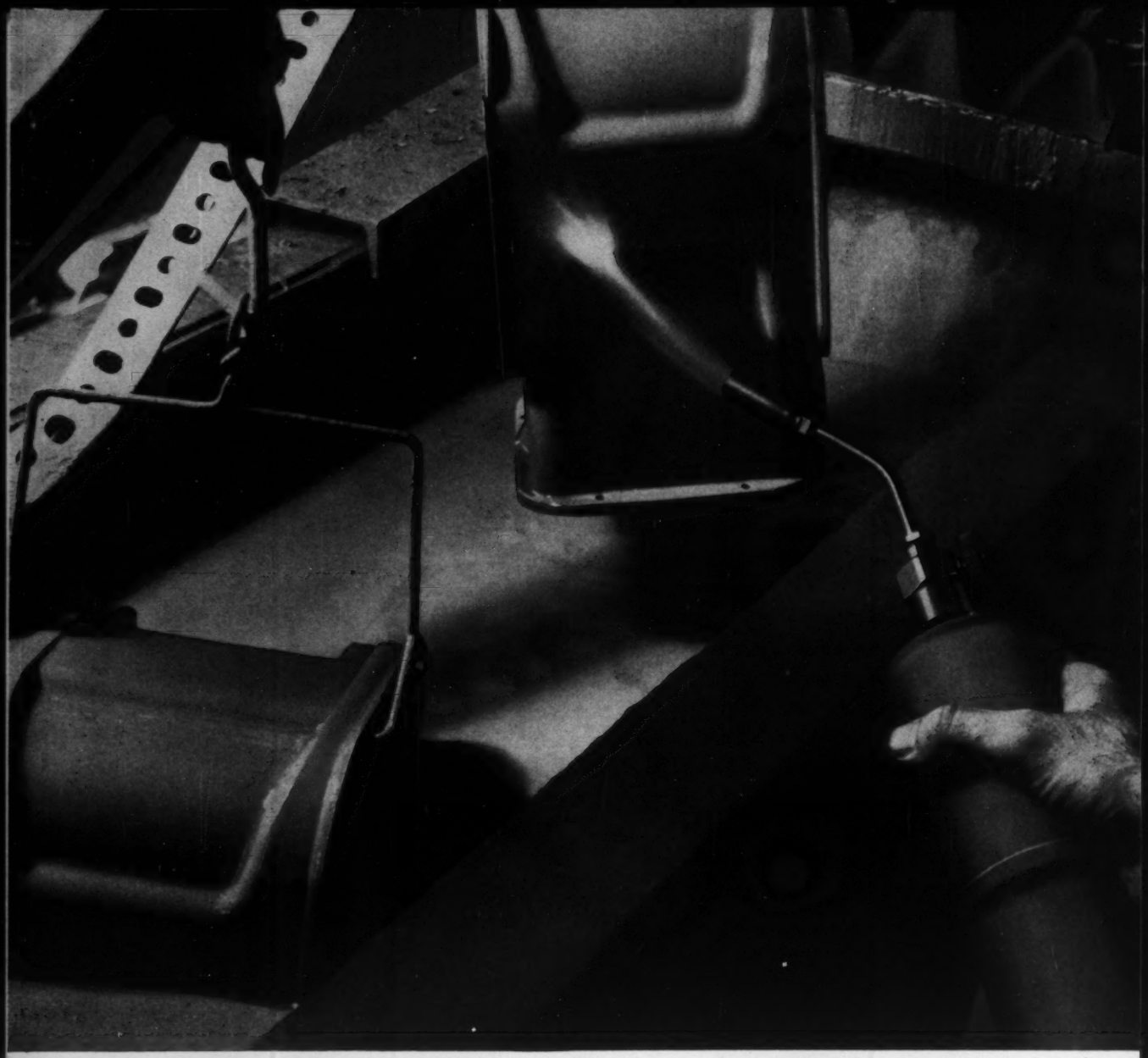
Standard "building block" tooling elements combine for an infinite variety of arrangements. Operations can often be combined for reduced handling and improved quality. One man can handle multiple units. Floor-to-floor times are cut to a minimum.

Whether your "special" jobs include rings, discs, flywheels, sheaves, bevel gears, motor frames or complex housings, compare your production costs. You, too, can do it for less!

Ask your Gisholt Representative or write for Catalog 1159-C.

GISHOLT
MACHINE COMPANY
Madison 10, Wisconsin, U.S.A.

Turret Lathes • Automatic Lathes • Balancers • Superfinishers® • Threading Lathes • Factory-Rebuilt Machines with New-Machine Guarantee



500 gallons of insurance against fire hazards

Because the "solvent" in this dip tank is plain old fireproof water, even a flame from a torch won't set the finish on fire. It's a Glidden water-reducible finish, containing no volatile solvents, no combustibles, no explosive fumes, no toxic or irritating chemicals.

Water-reducible finishes let you apply more paint in one application than with solvent systems. Costs are competitive with those of solvent-type finishes.

Glidden will help you switch to water-reducible finishes for your products. Ask your Glidden salesman for information on the complete line including new gloss finishes.

QUALITY Glidden PRODUCTS

FINISHES FOR EVERY PRODUCT
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INDUSTRIAL PAINT DIVISION
900 Union Commerce Building • Cleveland 14, Ohio
In Canada: The Glidden Company, Ltd., Toronto, Ontario

No matter what your product, process, or problem, Glidden finishes plus Glidden Technical Service can provide the answer.

Wages vs. Sales

Metalworking employment costs this year will reach $58 billion. The industry's aggregate sales will be about $150 billion. Each dollar spent for wages, salaries, and fringes will generate $2.60 in sales.

In 1950, when the industry's sales totaled $82.6 billion, its employment costs were only $20.6 billion. Then, each wage dollar generated $4.01 in sales.

The dollar spent today for employment costs brings in 34 per cent fewer sales dollars than it did 12 years ago.

The decline (see Page 81) has become more pronounced in recent years. The growth in aggregate sales has slowed—due in part to relative price stability. Employment costs—wages, salaries, and fringes—have continued to climb sharply.

In pattern setting basic steel, employment costs have increased 27 to 30 cents an hour since the last wage settlement, without any compensating increase in prices. To a greater or lesser degree, the same situation prevails in other metals industries.

The result: A severe profit squeeze.

We have less to spend for plant and equipment modernization.

We have less to spend for research and product development.

Our ability to grow and to provide jobs is impaired.

Even our ability to pay taxes wanes. Not only is the profit base smaller, but much of the increase in employment costs is made up of fringe benefits. Fringes largely escape direct taxation at both the employer and employee levels.

The situation has arisen because leadership in employment cost determination has been pre-empted by the government and the unions. Management has defaulted its responsibility—albeit involuntarily.

The cause suggests the cure. Management will have to regain its leadership.

Obviously, the trend toward higher employment costs as a percentage of sales will have to be halted or reversed. That is easier said than done. To reduce present wages or salaries would be difficult and probably unwise. To resist future exorbitant demands will be mandatory.

The correction of our present imbalance will require better motivation for efficiency and productivity.

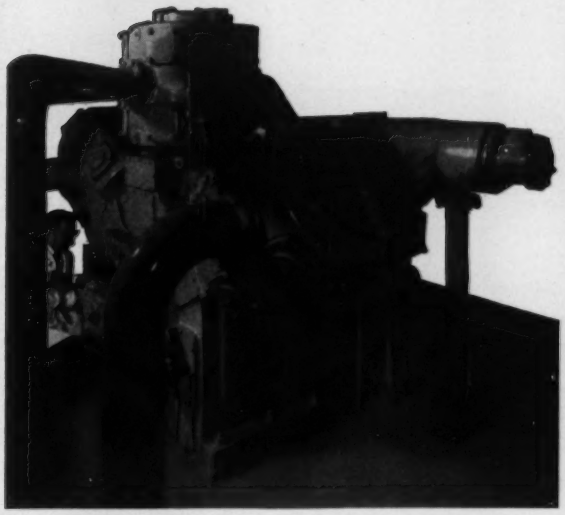
That may well be management's greatest challenge today.

Walter J Campbell

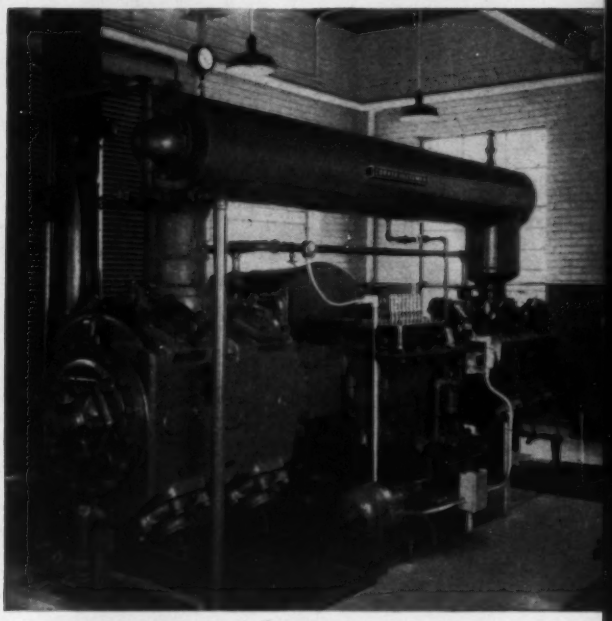
EDITOR

George Edick, *Domestic Sales Manager, The Cooper-Bessemer Corporation, and* Floyd Paschke, *Sales Manager, The Rotor Tool Company, explain...*

HOW TO BOOST YOUR PRODUCTIVITY WITH COMPRESSED AIR



Installing a Cooper-Bessemer DMR-3 Air Compressor for foundry service. Capacity is 1670 cfm at 110 psig discharge. Other units available for service down to 572 cfm.



Cooper-Bessemer Model EM Air Compressor in a metal-working plant. Rated 1125 cfm at 110 psig discharge. Other models in ratings up to 10,000 hp.

The thing that counts in getting top output with air tools is *air pressure at the tool, under load.* Is this productivity what it should be in *your* plant? Here is a service that helps you find out *for sure* . . .

The teaming up of application service engineering of Cooper-Bessemer and its new subsidiary, Rotor Tool, provides full-scope experience to help you analyze your compressed air needs and plan your facilities for optimum production efficiency. This experience encompasses the study of compressor capacity requirements, number of compressors and their location for greatest economy, regulation of the plant, the distribution system and portable air tools. This service is yours without obligation.

It will pay you to call in the nearby application engineer of Cooper-Bessemer or Rotor Tool to help you make sure that you are getting maximum productivity with compressed air.

BRANCH OFFICES: Grove City • New York • Washington • Gloucester
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For over 75 years steel has been poured into Valley Moulds, and now the new metals... used in space . . . . will also be poured into

VALLEY INGOT MOULDS

Steel

Support the STEELMARK

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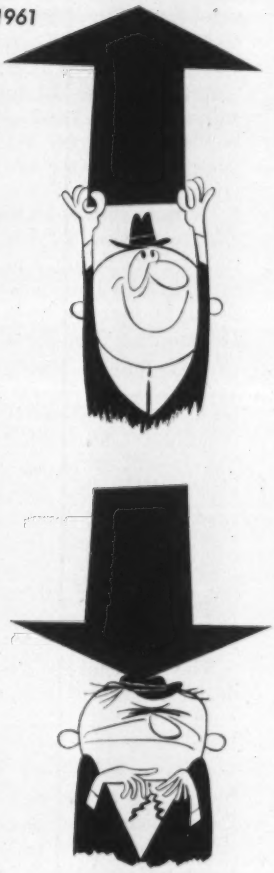


FRB Indexes: 3 Up and 4 Still Down

(Seasonally adjusted)

	1960			1961	
DURABLE MANUFACTURES	OCT.	NOV.	DEC.	JAN.	FEB.*
Primary Metals	78.3	73.6	69.3	71.9	74
Electrical Machinery	105.0	106.8	108.2	109.0	110
Aircraft & Other Equipment	89.3	90.0	88.9	88.6	89
Fabricated Metal Products	105.4	101.0	100.7	99.2	98
Nonelectrical Machinery	99.8	98.4	96.2	95.3	95
Motor Vehicles & Parts	116.1	103.1	97.5	88.4	85
Instruments & Related Products	118.6	118.7	116.4	116.0	113

*Preliminary.
Source: Federal Reserve Board Industrial Production Index, 1957 = 100.

March Business Perks Optimism

BUSINESSMEN have good reason for optimism. Leading indicators have turned up within the last few months; some have held steady; and those that are down still show signs of spring growth. The outlook: Definite but modest increases ahead.

• **The Omens** — STEEL's editors spotchecked the new order situation with metalworking managers and found the word "optimistic" was the most universal reply:

Republic Steel Corp., Cleveland, reports: "Incoming orders have improved recently, and we've stepped up operations to meet them . . . the order rise comes from a broad cross-section of customers."

Eastern Stainless Steel Corp., Baltimore, says: "We've pulled ahead slightly in orders."

"Orders for cold finished steel bars are the best in 14 months," comments Fred J. Robbins, president, Bliss & Laughlin Inc., Chicago.

"We've made substantial increases in production schedules . . . and several additional increases will take place in the weeks immediately ahead," says Frank W. Jenks, president, International Harvester Co., Chicago.

"Companies that don't even carry inventories are buying more steel now," notes Robert Welch, executive vice president, Steel Service Center Institute, Cleveland. Inventories of member companies hit bottom at 2.85 million tons of industrial steel products vs. a norm of 3.4 million to 3.5 million tons. "Sales are up a little more than 10 per cent over the November-December average," he says.

Since January, a Long Island metal stamper's sales rate has regained half of the 15 to 20 per cent drop which occurred in the final three quarters of 1960 and early this year.

A Cleveland manufacturer of industrial electrical equipment says booked orders have been on a higher level since December.

"Indications are that March shipments will be substantially better than the rate in the two preceding months," notes Edmond P. Severns,

Signal that metalworking has been waiting for . . .

Auto Dealers Cite Buying Spurt

"THE SLUMP is over in the auto retail market. People are not afraid to spend their money. Our March sales are 10 per cent over January's and will probably end up better than March, 1960, sales."

That burst of optimism came from Birkett L. Williams, Cleveland Ford dealer and past president of the National Automobile Dealers Association.

Because of the auto industry's importance to metalworking, a substantial upswing in auto sales could signal the business upturn that executives have been straining to identify for the last four weeks. STEEL editors checked on how auto dealers in other cities were doing. They found:

• **Washington**—L. P. Steuart Inc. (Chrysler dealer in suburban Bethesda, Md.): "March is running 100 per cent better than either January or February. It's about 10 per cent better than March, 1960." Cherner Motor Co. (Ford): "Business in the last two weeks has been better than at any time in the last six months."

• **Pittsburgh**—Divisional sales offices of the automakers were polled. Buick: "The first ten days of March were the best ten we've had since November. Our sales were 75 per cent higher than they were in the last ten days of February." Ford: "The used car market is good, and that's important because we can give good trades on new models. Sales in the second ten days of March are ahead of the first ten days." Chrysler: "First 20 day sales of all four Chrysler makes were up 80 per cent from the same period in February and 35 per cent over the January period. However, sales are still 45 to 50 per cent below last year's levels." Chevrolet: "We sold 177 cars in Allegheny County in the first ten days of January; 214 in the same February period; 336 cars in the first ten days of March; and 379 cars in the second ten day period."

• **Chicago**—Edward L. Cleary, general manager, Chicago Automobile Trade Association: "Auto sales have gone up a little since the latter part of February and the Chicago Auto Show, but there are no real indications of a spring upturn." Courtesy Motors Inc. (Ford): "March business has been on a par with January's and February's—but we had good sales in those months considering the times."

• **Detroit**—Simms-Dawson (Ford): "We're getting 20 per cent more traffic through the showroom, and car deliveries have picked up steadily since January." B. J. Ratigan (Plymouth, De Soto, Valiant): "We've noticed more action, and our orders are 50 per cent above January's." Shore - Severs Co. (Cadillac, Oldsmobile): "I expect March will wind up 10 per cent ahead of the first two months this year." Kessler Buick Inc.: "Our traffic is so heavy salesmen can't keep up with it." Dexter Chevrolet: "We're off 30 per cent from last year, but we're seeing a little more showroom traffic now."

The automakers are confirming dealer reports of sales increases in recent weeks. Commented Ford Motor Co. vice president, Lee A. Iacocca: Indications point to a blossoming of the new car market. He predicted March new car sales would hit 500,000 units. He cited these factors behind his optimism:

1. Used car sales bottomed out in December, and prices have increased 11 per cent since then. That means bigger trade-ins on new cars.
2. Truck sales have picked up, with emphasis on small panel trucks, indicating confidence by small businessmen.
3. Credit is easy to obtain.

Industry observers also point out that inventories are still high—around the million mark. If the sales pace continues, it'll still be six to eight weeks before a substantial increase in production schedules will be made by the automakers.

---

president, Continental Steel Corp., Kokomo, Ind.

• **Doing the Sidestep**—Most managers exhibit confidence, but some of them have little more than hope to go on. "Last week's orders were more sidewise than up," comments an official from a major steel company. "There's no change in automotive demand for March and April," he says.

"There's nothing specific in new orders—still just a hope that spring will see a pickup," says an executive of the Industrial Fasteners Institute.

The Drop Forging Association reports that January and February business levels were the same.

"Smaller companies are placing orders," notes the Steel Founders' Society of America. "Bookings are down, February vs. January, but some regional pickups were noted in mid-March."

More inquiries and orders are

coming in, report members of the Gray Iron Founders' Society Inc. The industry's operating rate dropped from 58 per cent in January to 53 per cent in February. A member ballot indicates the March rate should be up.

• **Government Indicators** — After nosediving for half a year, the Federal Reserve Board's Industrial Production Index leveled off in January and February at a seasonally adjusted rate of 102 per cent of the 1957 average.

Other factors: Durable goods manufacturers reported a 2 per cent increase in new orders for February over January. They also tallied a 1 per cent increase in shipments last month . . . U. S. Commerce Department revealed that private housing starts were up 7 per cent in February . . . Following three months of decline, retail sales increased slightly in February, peaking 1 per cent above January's figures . . . The seasonally adjusted unemployment rate in February, at 6.8 per cent of the labor force, was about the same as in December and January . . . Iron and steel production increased with the FRB Industrial Production index moving up from 66.8 in January to 71 in February.

• **The Big Step**—One executive said he felt like a blindfolded tightrope walker, poised on one foot, juggling inventories, orders, production, employment, and shipments, while searching gingerly with the other foot for more substantial ground. Here are some other reports from industry that illustrate the delicate balance of business in March.

A major steel company reports a "creeping upward in orders, even if we deduct tin plate," which has been relatively strong due to cannery demand. "Orders for cold rolled sheets are gradually improving. With low inventories and consumption inching upward, we're on the threshold of recovery. There's a lot of inertia on the part of buyers. The steel market is sort of like a garter—it can only stretch so far before it snaps."

• **Appliances**—Westinghouse Electric Co. reports March sales of major appliances in 45 counties of Ohio, West Virginia, and Pennsylvania are normal for the season, up 10 to 12 per cent from February. "We don't look for any big improvement in April—people will be paying for Easter clothes and settling up with Uncle Sam—but we're hopeful for May," says a company executive.

A Pittsburgh department store, Joseph Horne Co., notes that March sales are up 20 per cent over those a year ago and better than last month's volume. Laundry and refrigerator units are doing well. "We think everybody has gotten over the recession chills now," says a store official.

E. J. Korvette Inc., with 20 retail stores in the East, comments that appliance sales are up 5 per cent in March vs. February, and 5 per cent over March of 1960.

• **Hopscotching Sectors** — Youngstown Sheet & Tube Co. announced the relighting of three open hearths last week and also disclosed it would fire up other furnaces and recall hundreds of workers.

Industrial orders increased early in March for a copper and brass mill in the East. Aluminum orders also picked up enough to cause the company to lengthen leadtimes on deliveries . . . "Improved activity in construction machinery and the need for replenishing dealer inventories," sparked the recall of about 400 of the 1200 workers furloughed in March, 1960, by Allis-Chalmers Mfg. Co.'s Springfield, Ill., plant . . . A maker of steel strapping in Chicago said March sales are up slightly over the previous two months but below a year ago. The improvement is in the appliance and paper industries . . .

A spokesman for Cleveland Pneumatic Co., a division of Cleveland Pneumatic Industries Inc., says a switch from emphasis on aircraft to missiles has created a decline in business. March orders are even with those of the last two months . . . Oil country requirements are expected to boost sales for a metal forge and tool maker by 10 per cent in March . . . A Cleveland instrument firm has a steadily rising order rate, but it's running below a year ago by about 10 per cent . . . A manager with an industrial truck firm says: "The company had an exceptionally good order volume in January, but expects March to be down" . . .

An Eastern gear manufacturer found February orders were the lowest in some time and sees only small improvement in March . . . L. M. D'Onle, sales manager, Kerr-Lakeside Industries Inc., Cleveland, says: "Fastener orders are picking up a little bit and more inquiries are coming in" . . . Douglas Brien, executive vice president, Ohio Gear Co., Cleveland, says March orders equal those in January and February.

Changes in Defense Buying Speed Payments, Help Small Firms

TWO CHANGES in defense contracting are likely to spread money more quickly into more places and aid the economy's budding upturn.

President Kennedy has announced that the armed services have been ordered to halt the decline in prime contracts awarded to small businesses.

Deputy Defense Secretary Roswell Gilpatrick announced the cancellation of the 1957 directive that provided for the withholding of 20 per cent of the contract price (in some cases) until delivery of the product to the military.

• **What the Actions Mean**—The first order will channel more money to small firms. The second puts money into circulation faster.

Prime contracts to small business equaled 16.1 per cent of military awards in fiscal 1960, but they slipped to 15.5 per cent in this fiscal year.

Shifts in organization, administration

Get the Most from

Costing . . .

More attention must be paid to final unit cost rather than to those of separate production steps.

Sales Techniques . . .

Salesmen must be trained to determine whether parts can be made by N.C. or conventional methods.

Purchasing . . .

Traditional leadtimes and delivery times may have to be re-evaluated.

Engineering . . .

Drafting formats may have to be altered. Special reference and inspection standards for tool design are required.

IN SEVEN YEARS, numerical control (N.C.) has grown from infancy to adolescence. Like any teenager, its growing pains are as much psychological as physical.

For example: The technique calls for a new way of doing things: Traditional administrative and production practices must be approached differently to realize its full savings potential. But if it is used properly, it can pay for itself in a third less time than it takes to amortize regular machining equipment, claim proponents.

One big area of opportunity: "At least 4.5 million persons are employed in metal removing (machining) shops handling short run jobs," says an executive of Miehle-Goss-Dexter Inc., Chicago. "These plants are ripe for N.C. M-G-D's 22 tape controlled machines show average cost savings of up to 40 per cent over conventional equipment. Downtime averages less than 5 per cent," he adds.

• **Costs Shift**—When considering numerical control, don't forget that traditional patterns of cost allocation will be changed considerably. Many costs once charged to direct production will shift to indirect burden areas. Total maintenance costs are usually higher. Tool de-

will help you . . .

Numerical Control

sign and preparation costs will be pared drastically, often more than 70 per cent.

Suggests Ray Nymberg who acts as N.C. co-ordinator at Bendix Products Div., South Bend, Ind., Bendix Corp.: "To properly compare and evaluate N.C. production, management must look at the final unit cost of a job, not just at specific costs of some phase of the production process. The traditional cost ratios simply don't apply to this method of machining." His division adopted numerical control in 1954. It now has six systems in operation and two more on order. Mr. Nymberg figures total production savings have averaged 30 to 40 per cent. For some jobs, better than 90 per cent savings have been achieved. Although overhead rates are higher per machine, Mr. Nymberg points out that productivity is higher too. He figures on 3 to 5 times more output from point to point controlled equipment and 6 to 10 times more from continuous path systems.

• **Here's Why** — To understand why cost ratios will shift, you must take a new look at operational practices that are so commonly accepted they're often overlooked when you integrate N.C. into your plant. Warns J. B. Rankin, N.C. co-ordinator, Convair Div., Ft. Worth, Tex., of General Dynamics Corp.: "It's difficult to realize that in one machine you may have the capabilities of five. As applications increase, the results begin to be felt in the most unpredictable areas. Methods of projecting costs, schedules, and workloads on historical data soon become ineffective, and new approaches are advisable."

Here's a rundown of some areas that are frequently ignored.

Appoint Strong Leader

Before getting into detailed changes, the first step management must take is to appoint one person to head up the N.C. project. Most firms call him a co-ordinator, although that's seldom his formal title. He seems to function best at the staff level where he can communicate with top management and operating departments in the company.

A co-ordinator needs freedom to plan and develop your numerical control program. He must have authority to deal with key department heads and to quell empire builders. Mr. Nymberg thinks engineering training and administrative experience make a good background because the co-ordinator must analyze proposals ranging from complicated electronic systems to modern accounting procedures.

The co-ordinator also needs some sort of advisory group made up of representatives from different departments.

Mr. Rankin suggests: Each department involved should appoint one man through whom all numerical control activity and information will flow. "This plan sets up the initial structure and reduces confusion. It also sets the stage for allowing each department to handle its own problems. As the program expands, these key people will be in a position to provide more support," he asserts.

Choose the Right People

Attitude is as important as aptitude in selecting men to work with numerical control. "We want people who never learned or who can forget the 'old way' of doing things because the 'old way' is just too slow," states Mr. Nymberg. The personnel department is apt to find that job classifications and wage and salary administration need revision when it comes to selecting and training machine operators and maintenance men.

Since the control equipment (instead of the man) runs the machine, the operator tends to become a set-up man and inspector. The plant electrician must function as an electronics expert to repair control systems. It's a difficult concept for older, highly skilled workers to accept. If less complicated systems are used, you may find that your regular machinists and maintenance men can be trained to do the job adequately. Many firms are finding it advisable to train apprentices. Maintenance men, of course, should get a thorough education from the N.C. systems manufacturer. Where possible, use simple aptitude tests to help pick workers who demonstrate interest in such work. Try to avoid setting permanent job classifications for at least six months so you can find out what level of skills you'll need.

Educate the 'Front Office'

Failure to understand the changes numerical control may make in accounting, sales, and purchasing offices can dilute its effectiveness. Your N.C. co-ordinator must work with accounting to develop forms and records for properly allocating the new types of costs generated. Tape, for example, is generally considered a tool. Its processing comes under direct labor tooling costs. The raw tape is billed as tooling material.

The cost records should be the basis for all types of budgeting and estimating, including tooling and production. Says Mr. Rankin: "Until we are able to reflect the cost reduction effect of N.C. into a bid, we have not used it as a tool to get more business."

Equally important is the job of educating accounting so it will understand how budgets and departmental fund allocations can be distorted by N.C. As explained earlier, tooling costs are lower, but the department that handles programing will have a much higher workload and higher costs. As product design begins to incorporate changes to take advantage of numerical control, several parts will be integrated into a single-part design. "Eventually, this will be felt by a reduced workload in such indirect areas as manufacturing control, material handling, inspection, and assembly," predicts Mr. Rankin.

• **Sales & Purchasing**—"Train your salesmen so they know how numerical control works and what kinds

of parts it can handle best," says Mr. Nymberg. Then they can more quickly determine whether a customer's job can be done with N.C. or with conventional equipment. Instead of just sending back a sample part and waiting for a cost analysis, they may be able to suggest its analysis for either N.C. or conventional production methods. Salesmen must also learn to re-evaluate leadtimes and delivery times.

Purchasing faces a similar scheduling problem. Because numerical control production is so fast, purchasing can't depend on traditional leadtimes for quotations and delivery. Purchasing must be sure it can supply materials and replacement parts in a matter of hours, not days, if such service is necessary. Most companies stock an adequate supply of replacement parts, but smaller firms might find it cheaper to pay a small warehousing or service fee to have an electronics supply house stock parts.

Reallocate Costs

• **Processing** — Part design, specifications, basic lines and data are engineering areas most likely to be affected by numerical control. You may have to alter drafting formats so various lines and data can be easily translated into numbers and symbols for processing and programing. Care must be taken to provide a selection of optional data. "Make sure operators know exactly which table position to locate on. Plan for the simplest sequence of operations possible to avoid excess table and tool travel. Know where your finished areas are after each operation is performed. There's no sense in trying to lay out locating holes on a finished surface," comments the Miehle-Goss-Dexter executive.

• **Tooling**—"The biggest thing to realize is that tooling must be simple and as accurate as you can get it," adds the executive. Special reference and inspection standards will have to be established for tool design. Remember that the operator no longer can use his judgment on machining operations. Rake angles and flutes on cutting tools may have to be changed to compensate for preset production.

• **Programing**—Here's the payoff point where all the information needed to operate the machine is collected and organized in numerical form so it can be translated onto tapes or cards. It's a highly skilled area that's not needed for conventional machining. To understand why it's a high cost item, your management should realize that programers usually have the equivalent of a college degree. They need extensive mechanical and processing backgrounds for point to point programing. Continuous path programing calls for people with applied mathematics and computer training.

Tape preparation is another job that's peculiar to N.C. This is not a part time job for a girl from the secretarial pool. Mr. Nymberg says it calls for skills equal to those of a trained Comptometer operator.

Plan Preventive Maintenance

Maintenance seems to be one of the least understood areas so far as management is concerned. Because numerical control is so much faster in total production time, it's hard to understand how expensive it becomes if the equipment has to shut down even for a few hours. Most shops figure downtime of 5 per cent is the maximum. Lack of proper maintenance can quickly boost the figure to 30 per cent. That's why co-ordinators insist on a costly stock of replacement parts. Regularly programed tool changes are a must. So is preventive maintenance.

Advance in Technology: Aluminum from Clay, Shale

A BREAKTHROUGH in the search for a commercially practical way to produce aluminum from common clays and shales has been revealed by Olin Mathieson Chemical Corp.

Olin's acid process (it's in the pilot stage) opens the possibility of placing a complete aluminum plant on one site where coal for electric power is cheap—the shales associated with most coal could be an excellent source of alumina. Currently, the aluminum industry obtains more than 80 per cent of its bauxite—containing 45 to 60 per cent alumina —from overseas sources.

W. E. Hanford, Olin's vice president-research, says the process can start with materials containing as little as 20 per cent alumina.

• **How It's Done**—The process has three steps:

1. Leaching the clay or shale to produce an acid solution of iron and aluminum sulfate. Much work has been done by others in this field.

2. Separating the iron and aluminum sulfate by means of crystallization. This was the big hurdle. Previously, crystals of aluminum sulfate could be produced, but they were too small and mushy and carried large quantities of entrained iron. Olin's method produces large crystals. Their purity is high, and the percentage of recovery of aluminum is excellent, officials say. Crystals range from 1/16 to $\frac{1}{8}$ in. in diameter. (Those made by previous methods were less than 1/100 in.)

3. The next step: Find a thermal method to decompose the aluminum sulfate to alumina and economically recover the sulfur trioxide—it would be recycled to the leaching process (Step 1). Several schemes have been evaluated, and tests with the pilot plant equipment are planned.

• **Ohio Plant**—Olin, fourth-largest integrated aluminum producer, is co-owner (with Revere Copper & Brass Inc.) of the Ormet Corp. aluminum reduction plant at Hannibal, Ohio.

It is in the heart of the West Virginia-Ohio coal belt, and millions of tons of alumina containing shales are available as coal mine waste.

The Ormet plant, third largest in the nation, currently obtains bauxite from South America, refines it to alumina at Burnside, La., and transports the alumina up the Mississippi and Ohio Rivers to Hannibal.

Cary Wilson, Modine's sales chief, talks about . . .

An Approach to Better Wholesaler Marketing

SALES PARTNERS: That's how Modine Mfg. Co. describes its wholesalers.

The Racine, Wis., firm recently initiated a marketing program which makes the wholesaler part of its sales force.

Cary Wilson, sales vice president, explains: "Our program is designed to sell through wholesalers, not to them. There's an important distinction. By selling to wholesalers and treating them simply as customers, we succeed only in filling their warehouses. That's not our objective. We want to sell through the wholesaler to get our products to the ultimate customer."

Modine feels its program could trigger widespread changes in wholesaler-manufacturer relations in the plumbing and heating, industrial, electrical, warm air, refrigeration, and air conditioning markets.

• **Old Way**—In the past, the firm let its sales representative decide whether he wanted to sell products through a wholesaler, or direct to the installer. Under its new policy, Modine guarantees that no wholesaler designated product will be sold direct. Manufacturers' representatives now help wholesalers sell by calling on architects and engineers to develop specifications and create a demand for Modine products.

• **Based on Needs**—In addition to the firm wholesaler policy, the company's program covers eight other basic needs of the wholesaler. They are: 1. Give full freight allowances on all wholesaler products. 2. Allow a 2 per cent cash discount within ten days after shipment and uniform trade allowances of 25, 20, and 10 per cent from list. 3. Give cash bonuses for replacement sales. 4. Guarantee a line of quality products that have good customer acceptance at competitive prices. 5. Work with wholesalers in developing product specifications and other sales engineering jobs. 6. Conduct training meetings with wholesaler personnel to familiarize them with the product; show them how to demonstrate it; how to apply it. 7. Provide complete plans for lines. A wholesaler may choose one or more plans. 8. Provide complete lines of products, so that the wholesaler may sell complete systems.

• **Plan**—The program had its beginning in 1957 when the company decided, following an extensive market study, to sell its gas unit heaters only through stocking wholesalers. The success of that program led Modine to add its top products, steam and hot water unit heaters, to the stocking program the following year.

In the new program, Modine has more than quadrupled the number of products it plans to sell exclusively through wholesalers.

Mr. Wilson says that the "objective of the new program is to insure coverage of all market areas. We want to reach all markets and at the same time effect a minimum of overlap. We don't want our wholesalers competing with each other—and, obviously, we won't be competing with them in any way.

"At the same time, we want to provide a program that will help the wholesaler sell merchandise profitably. We want a wholesaler who will take this program, put the necessary manpower behind it, and work with us closely to make it effective.

"Finally, we believe our product line and our method of doing business will cut the wholesaler's operating costs. He will be dealing with one supplier for a complete line of products; he will have one set of billing; standard discounts make pricing easier; and full freight allowances allow him a greater profit margin."

Although the program is still new, Mr. Wilson feels it is getting good acceptance from wholesalers.

McNamara's 'Command' in Pentagon Takes Shape . . Gear Hobber Sale Poses Question of U. S. Defense Needs

ROBERT McNAMARA is stirring the pot at the Pentagon with a sure hand. The new defense secretary has so far put through these major changes that affect metalworking: 1. Centralized research in military space programs in the Air Force. 2. Centralized aircraft and missile systems development and procurement in a new command—the Air Force systems command. 3. Simplified industry relations with the services—contractors are paid in full for their costs as they accrue.

The ex-president of Ford is able to cut through the puzzle of interservice rivalries by ignoring them. He counts heavily on a team of expert civilian advisers, many of them drawn from the Air Force's "think shop" on the West Coast, the Rand Corp. Charles J. Hitch, assistant secretary of defense (the comptroller), is one of the men directly responsible for seeing that the secretary's wishes are carried out. The co-author of *The Economics of Defense in the Nuclear Age*, he supports the idea that the military budget is one of the secretary's best methods for efficient management control of the Pentagon's mazelike activities.

Using the budget as a management tool, he says the present financial system for the Defense Department does not fully disclose the costs of the new weapons or relate them to the missions they are supposed to perform. The budget, properly laid out and understood by all concerned, can be the best tool the secretary has for making the crucial decisions about starting new programs, continuing old ones, or beginning research in entirely new and apparently unrelated fields.

Mr. Hitch wants a mountain of data for the secretary: All costs of a system, beginning with original research and extending through development, production, deployment, and operation—they cover the whole life of the system. The cost estimates must be made available to the secretary early enough in the system's life to compare it with other available systems so that the right system is chosen. The elaborate computations necessary to provide such information will be made by the latest data processing equipment.

Secretary McNamara's realization soon after he came to Washington: Most decisions at the Pentagon were made for political, service, or intuitive reasons. Mr. Hitch will give him the latest tools for decision making. The tools will provide him, in turn, with a quantitative method of attacking such problems as: 1. What are our national security objectives? 2. What are we trying to accomplish with our various and sometimes conflicting forces, strategies, and tactics? 3. Which weapons system is the most efficient for a particular problem?

By the looks of things, modern management has at last come to the Pentagon.

Enough Gear Hobbing Capacity?

● **NAVY TO SELL GEAR HOBBERS**—If you recall, in 1953, the government was concerned enough about the production of gears to advocate a $50 million program for ten contractors. It would have rounded out the U. S. production potential for such items as 200 in. gears. Only two companies went into the program, and it gradually died a death brought on by bureaucracy and disinterest.

The fact remains: The U. S. lacks gear hobbing capacity, at least the Maritime Administration says that privately. The latest development in the case: On Mar. 6, the Navy offered for sale as excess property (with the bid opening tomorrow, Mar. 28) some big hobbers, ranging from 96 to 160 in. They are being offered in Philadelphia at prices which will probably keep firms from buying and scrapping them, but they'll still go for only a fraction of their original cost.

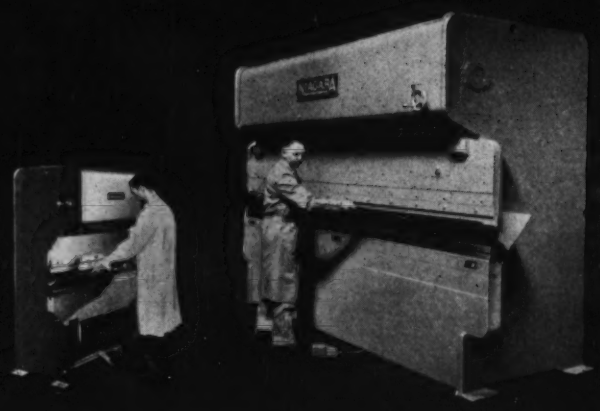
The Office of Civil & Defense Mobilization, which is supposed to keep constant check on our mobilization base, is watching the sale. It hopes that the hobbers will go to firms which will use them. There seems to be little chance that they will be shipped overseas, but OCDM will make sure.

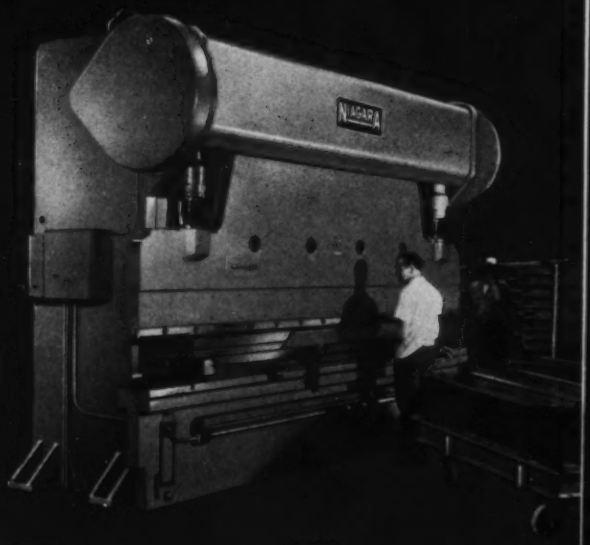
Behind the scenes, the sale appears to be a result of bureaucratic misunderstanding of the shift in war theory.

The hobbers might have been sold a couple of years ago because everyone was then convinced we had nothing to fear but an all-out, thermonuclear war.

Today, under President Kennedy, the shift is to the limited war concept. The obvious conclusion is that we will need the sort of mobilization potential represented by the hobbers, but, apparently, the Navy doesn't agree.

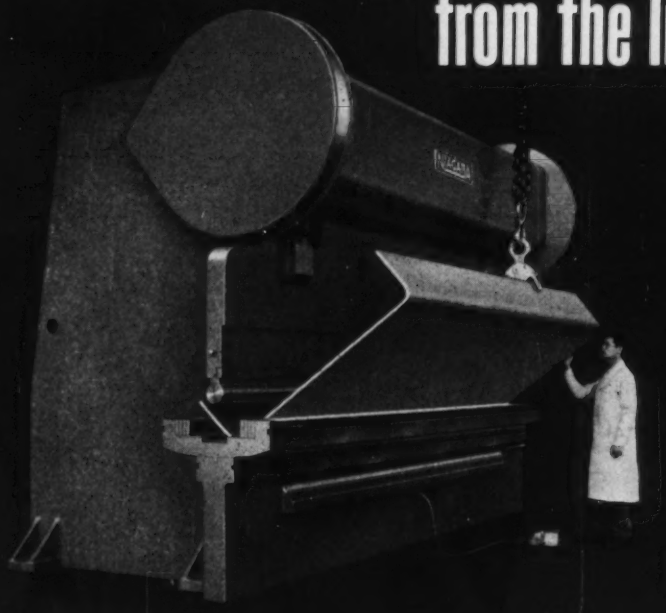
It's hoped the administration's position will be cleared up in the President's defense message that's scheduled for later this week.

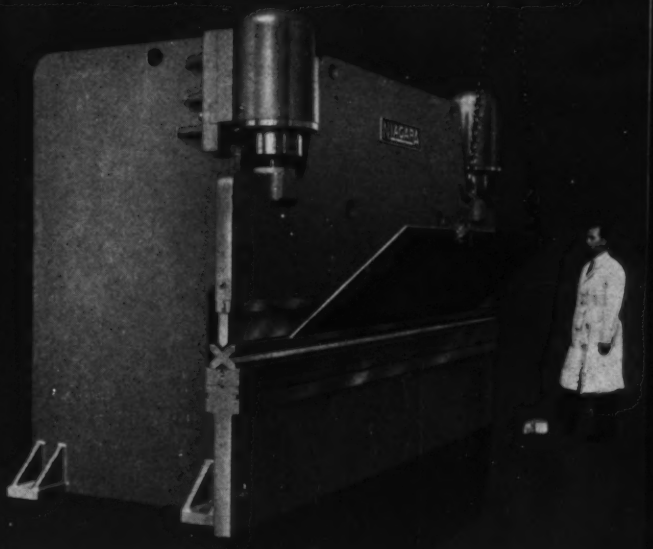




MAKE THE RIGHT DECISION

from the line that means the most





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THE PRESSURE OF WAGES

ONE METALWORKING employment dollar will generate only about $2.60 in sales this year if present trends continue.

In 1960, the pressure of employment costs was 28 per cent greater than it was in 1950—that's calculated from metalworking's decadelong decline in sales dollars per employment dollar (see chart).

How can we relieve the impact of rising employment costs? We'll have to find an answer or suffer more attrition in profits. In 1950, corporate earnings were 9.4 per cent of national income, but they shrank to 6.1 per cent in 1959.

One answer to the problem: Cut wages and salaries. That has been done, but not widely. It's always difficult to do—and sometimes impossible in the face of strong unions and the demand for good managers.

Safer and more effective are these remedies:

1. Know more clearly where you're going so you can make better long range plans.
2. Motivate your people to greater efficiency.
3. Mechanize.
4. Cut indirect costs.

Other approaches are possible, but those stand out. They are also interrelated.

Know Where You're Going

"The starting point is to know your goals in business," says Henry W. Spitzhoff, vice president of Robert Heller & Associates, Cleveland management consulting firm. "An amazing number of companies have no clearcut goals."

Mr. Spitzhoff asks: "How can a

company grow in profits if it doesn't know what it's shooting for?"

After the goals are set, plan (on the administrative level) how you are going to hit your target, advises Mr. Spitzhoff. Is the organization centralized or decentralized? Is emphasis on sales, production, research, finance? Or is it equally placed?

Next, people are needed to run the key spots. In planning business goals and operating to obtain them, you succeed only if you have the right people at the right places. Selecting them is perhaps the toughest job of all.

After you choose key people, you'll have to get competent helpers for them.

Then you'll need controls and checks to determine if your people are doing the job they're supposed to do. Here are three major controls you can use. All other checks stem from them.

1. Sales forecasts and statistical comparisons with the competition.
2. Checks on your profit margin and profit-on-investment.
3. Controls on budgets, assets, and liabilities.

What can new and better goals do for a company? Brunswick Corp., Chicago, used to specialize in such things as "billiard tables, bowling alleys, and toilet seats." It took a new lease on life when it espoused new goals—particularly to broaden its product lines to school furniture and equipment, boats, inboard engines, and missilework. The results were dramatic—sales jumped from $31.9 million in 1953 to $359.9 million in 1960. Even more sensational was the after-tax profit growth —$266,000 in 1953 to $38 million in 1960.

Motivate for Efficiency

"The quickest way your people become upset is if they get the idea you don't know where you're going," says E. L. Cushman, vice president of American Motors Corp.

So the target is the first step in motivating people to produce more. And you have to tell them what it is. "That's why communications are essential," adds Mr. Cushman.

Techniques of communications depend on your situation, but certain tenets hold no matter who you are:

1. Be truthful and credible.
2. Talk up, not down, to your employees.
3. Communicate continually.
4. Make your communications two-way by being as direct as possible. The face-to-face approach is best. Caterpillar Tractor Co., Peoria, Ill., gives this advice to make better communicators of its managers, from the foreman on up: Listen to your people; ask for their suggestions; tell them what's going on; tell them how they're doing.

A study by the University of Chicago's Industrial Relations Center shows that good communication is one of the six best ways to improve an employee's attitude. The other five:

1. Eliminate company bottlenecks. Poor departments, incompetent foremen, and bad work are as irritating to most employees as they are to management.
2. Train supervisors more thoroughly.
3. Develop job descriptions. Most people like to know their job boundaries.
4. Improve the physical environment—the lighting, cleanliness, parking space.
5. Improve discipline. Most people welcome reasonable rules that are reasonably enforced.

The same University of Chicago study reveals that wages and salaries are not as important as you may think. As long as they are competitive, four other factors have greater weight in motivating employees:

1. They want to be proud of their company and management.
2. They want to feel that the immediate supervision is competent.
3. They want congenial fellow employees.
4. They want the job to be interesting and fun.

Sums up Prof. E. Robert Livernash of Harvard's School of Business: "Good morale leads to good labor relations which are almost al-

Productivity Up, Wage Gains More Realistic, Says Economist Backman

At least one economist (a labor expert) is confident about American industry's ability to develop a tougher attitude toward increases in labor costs. Jules Backman, research professor of economics at New York University, told the Associated Industries of Cleveland:

"The inability to control costs during the 1958 recession came as a rude shock to many companies. Throughout the earlier postwar years, the ability to pass higher costs on to the consumer made many industries reluctant to fight vigorously against excessive increases in labor costs. One consequence (of the 1958 eye opener)

has been a stiffening of attitude toward excessive increases in wages and nonwage benefits and the initiation of a drive against featherbedding.

"The changes in average hourly earnings in all manufacturing between 1945 and 1960 (see the accompanying table) show that percentage increases have been smaller in recent years.

"Even more important are signs of some progress against featherbedding. Examples:

- "In Detroit, painters agreed to eliminate premium pay for using rollers.
- "In Chicago, plumbers have agreed to remove restrictions on the use of power tools and to permit cutting, welding, and threading of pipes off the job site.
- "Longshoremen have agreed to the introduction of containers.
- "Railroads and the operating employees are presenting data concerning featherbedding to a Presidential commission.
- "Study groups have been set up in the steel industry.

"It is probable that in the period ahead there will be a further intensification of the resistance against excessive wage and other labor cost increases. If this development should occur, one result would be a further modification of the magnitude of wage inflation."

Changes in Average Hourly Earnings, All Manufacturing

	Average Hourly Earnings	Increase in Cents	Percentage Over Previous Year
1945 . .	$1.02		
1946 . .	1.09	7	6.9
1947 . .	1.24	15	13.8
1948 . .	1.35	11	8.9
1949 . .	1.40	5	3.7
1950 . .	1.47	7	5.0
1951 . .	1.59	12	8.2
1952 . .	1.67	8	5.0
1953 . .	1.77	10	6.0
1954 . .	1.81	4	2.3
1955 . .	1.88	7	3.9
1956 . .	1.98	10	5.3
1957 . .	2.07	9	4.5
1958 . .	2.13	6	2.9
1959 . .	2.22	9	4.2
1960 . .	2.29	7	3.2

ways paired with high worker efficiency."

Mechanize

A STEEL survey of the managers who buy one-third of metalworking equipment indicates that metalworkers would spend $20 billion this year on machinery if they had unlimited funds. Their compromise is about one-fourth that amount.

Listen to Edson Gaylord, vice president and general manager for Ingersoll Milling Machine Co., Rockford, Ill.: "In 1932, we had 260 machine tools. Today, we have 194. But the 194 can produce eight times the dollar value of product that the 260 turned out."

Industry recognizes that such improvements are common and are a major answer to the pressure of wages. So why isn't more done in this area? Chiefly for three reasons:

1. Few companies have a planned approach to equipment needs.
2. Even fewer spend year in, year out despite business fluctuations.
3. Few get maximum benefits from their spending.

The first job is to diagnose your equipment needs. That's readily managed—if you keep records, if you always question your methods, if you know what equipment is available, if you employ good guides like the replacement formulas developed by Machinery & Allied Products Institute, and if you forecast your requirements well in advance.

Those things need organization. A cross section of 48 Cleveland firms turned up only 1 in 4 that organized its approach to equipment buying. An organized program requires a capital spending budget, a procedure for originating equipment proposals, a setup for evaluating those proposals, and clear indication of who is responsible for making the final decision.

The plant superintendent, general manager, or foreman originates requests for replacement spending in 7 out of 10 cases. Production middle management originates most requests in companies employing 200 or more. In smaller firms, top management assumes the duty.

Metalworking tends more and more to evaluate equipment proposals by committee, STEEL studies show. Some sort of executive group does the job in 30 per cent of the cases examined. Actually, some bigger firms have a whole series of evaluation points.

The person making the final decision on whether to buy equipment rarely does the evaluation. In nearly half the cases, the president approves or rejects proposals after the executive committee has made the initial evaluation.

When your capital spending program is well organized, half the battle is won for a continuing and

Wage Settlements Dip

Pay increases negotiated by unions have dipped a bit since 1957 in the greater Cleveland area, Associated Industries of Cleveland reports. The area has a broad cross section of of industry by size and type, so it mirrors national trends. The figures below exclude gains in fringe benefits which have been averaging 2 to 3 cents an hour for several years.

(Weighted Average Increase in Cents per Hour)

	First Quarter	Year
1961	6.63	—
1960	6.85	6.81
1959	7.05	6.63
1958	6.54	7.30
1957	7.19	7.31

perhaps increasing re-equipment plan for the years ahead.

But the other half of the fight remains—the job of selling top management on the need to keep your program going year after year. H. Thomas Hallowell Jr., president of Standard Pressed Steel Co., says: "Middle management must make top management aware that profits wisely spent within the plant will be the key to greater output and lower costs."

Even if you are organized for the long pull, you still have not completely solved the problem of production efficiency if you don't get maximum benefits from expenditures. You can help assure that with better engineering, more use of your suppliers' brainpower, and selling labor on the need.

Cut Indirect Costs

Selling labor on cutting indirect costs is crucial too. They are the most rapidly rising of metalworking's costs today, as evidenced by the shift to whitecollar workers. In 1950, 18 out of every 100 metalworking employees were whitecollars (11 nonsupervisory, 7 management people). In 1960, 28 out of 100 were whitecollars (18 nonsupervisory, 10 management people).

Currently, the U. S. has 28 million whitecollar employees. And their profit propulsion is low, say the experts:

"Most clerical people are not doing any more than about half of what they should be doing"— A. J. Apgar, manager of methods planning and data processing, Clark Equipment Co.

"The efficiency of whitecollar workers has fallen by more than one-third in the past decade"—John Patton, Chicago management consultant.

The Bureau of Labor Statistics made productivity studies of 19 industries.

In 18 of them, the figures reveal that output per production worker has been rising more rapidly than output per employee.

Hear Dr. Robert N. McMurry, Chicago industrial psychologist: "So strong are the pressures toward bureaucratization that any group of 100 or more employees, if not carefully controlled, will almost certainly turn into a bureaucracy within five years. Once that happens, the bureaucrats begin to perpetuate themselves."

What can be done? In two weeks, STEEL will devote an article to that question.

Meanwhile, here are 12 steps for your consideration:

1. Hire better people.
2. Improve training.
3. Broaden skills.
4. Upgrade supervision.
5. Improve attitudes.
6. Measure the work.
7. Provide incentives where it is practical.
8. Reduce paperwork.
9. Improve environment.
10. Co-ordinate departments.
11. Improve systems.
12. Increase office mechanization.

Face the Problem Ahead

General Electric Co. summarizes the problem of the pressure from wages this way: "The country's businesses and jobs survived during a period when we in the U. S. could pass along increases in labor prices, in materials prices (largely labor), employment costs, and taxes to willing customers.

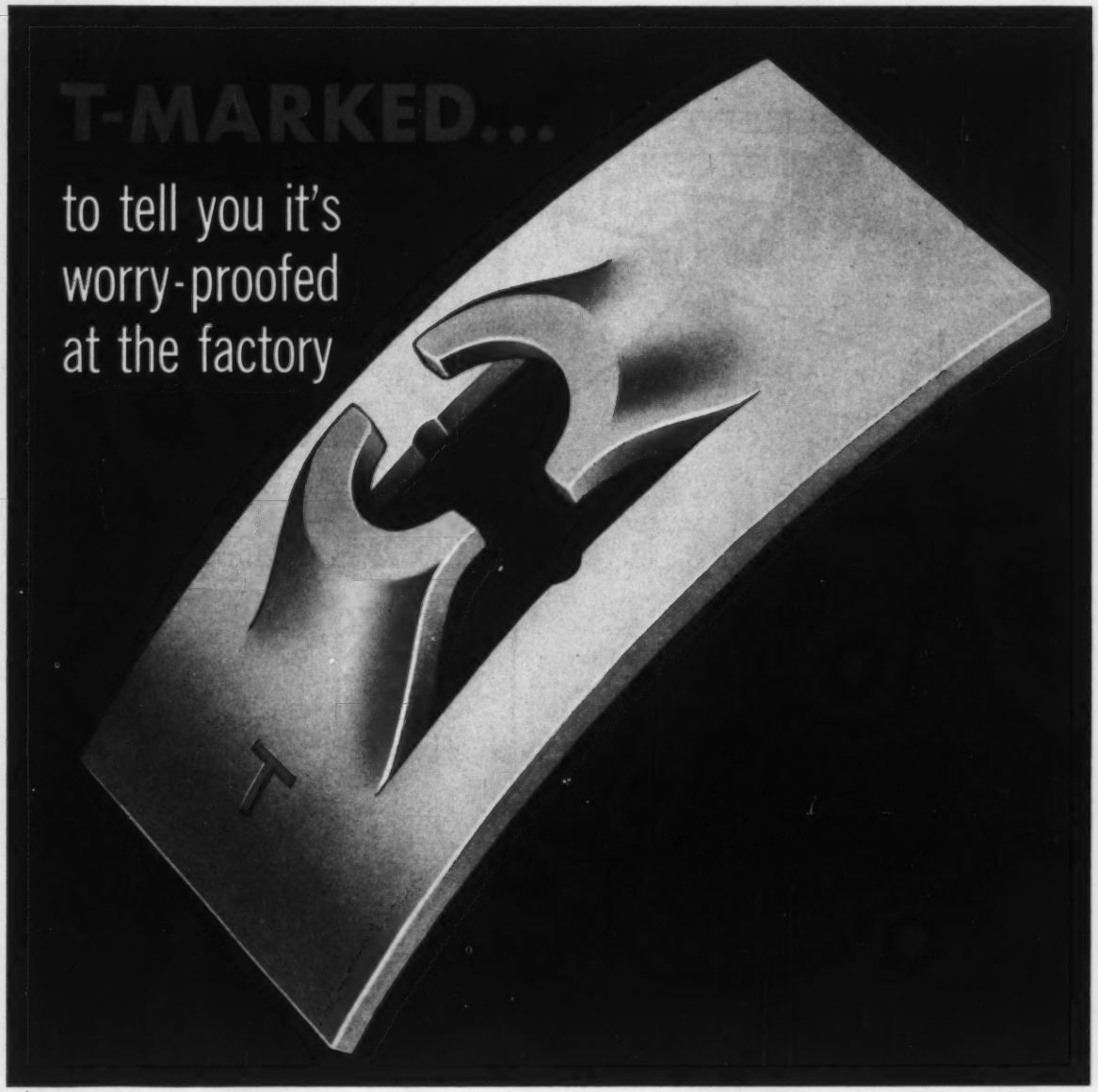
"But the reality of problems (in the sixties is this) . . . all businesses . . . are now facing too many customers here and abroad who will not, and do not have to, pay the present prices, much less the higher ones proposed. If we do not rapidly raise—rather than cut—the attractiveness of the values we offer, the customers here and abroad will not be able and willing to buy what we offer.

"Our problem is to try to find ways to obtain higher productivity and to convert this into values and prices that will secure expanding markets, steady customers, increasing volume, and jobs."

PLAN FOR PROFIT GROWTH

Pressure of Indirect Workers

On Apr. 10 STEEL will show how to increase the effectiveness of metalworking's rapidly increasing indirect workforce. For a free copy of any or all articles in this series (appearing biweekly since Jan. 16), write: Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.



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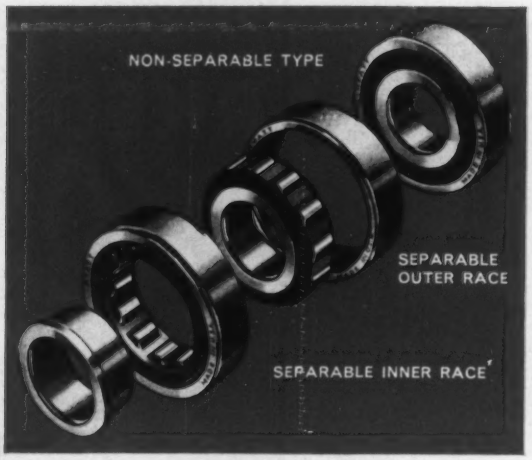

RELIABILITY

Hyatt reliability is measured by results. For example, The Hyatt Reliability Program embraces every phase of product development. In procurement, it weeds out all but the highest-grade raw material. In engineering, Hyatt Reliability insures efficient, accurate design. In manufacturing; it provides careful inspection and rigid adherence to specifications. And Hyatt Reliability does not stop there. Hyatt sales engineers work with you to help recommend the best possible bearing for your requirements. Then, they follow up to make sure Hyatt bearings deliver in service. And no one knows more about cylindrical bearings. For over 68 years, Hyatt has produced top-quality bearings for almost every type of application. Check the benefits that are yours when your "specs" read Hyatt.

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HYATT HY-ROLL BEARINGS FOR MODERN INDUSTRY

HYATT BEARINGS DIVISION, GENERAL MOTORS CORPORATION, HARRISON, N. J.

What Weight Means to Automakers

AUTOMAKERS are extremely weight conscious. In a business that figures costs in mills, even a few extra pounds can be important in establishing breakeven points and budgets.

For example, if planning volume is set at 500,000 units, an extra dime per car boosts costs $50,000. A single pound of cast iron can cost considerably more than 10 cents by the time it finally gets into a finished car.

Another example: The compact's lightness benefits both the consumer (better gas mileage and faster acceleration) and the automaker (lower material costs).

Ford Motor Co. engineers estimate that a typical compact uses 34 per cent less steel than a standard auto, 44 per cent less iron, 32 per cent less copper, 25 per cent less zinc, 63 per cent less aluminum.

• **What Price Overweight?**—For a long time, autodom has had only a hazy idea of how costly extra weight could be. Now, two Chrysler Corp. staffers, L. Artinian and S. L. Terry, have come up with a proposed formula. If it's fully developed, it can be used to predict how much it costs to add an extra pound to a vehicle.

Discussing their theory at the Society of Automotive Engineers (Detroit production meeting), Messrs. Terry and Artinian pointed out that each component in a car is generally designed separately. The weight of components is seldom added up during design to see if targets are being met. That leads to an often overlooked fact; Each extra pound added to any component usually calls for heavier structures to support it. The compounding effect adds unanticipated costs.

• **New Formula Tells** — Chrysler planners have begun establishing weight-cost tables that are completely separate from regular part pricing formulas. They make it possible to predict how much weight must be added elsewhere if the design weight of a component is exceeded. They also show how much the extra weight will cost.

The tables vary for different sized cars. Every 16 ounces added to a Plymouth's steering system calls for an additional half pound spread among various chassis parts. Including shipping costs, the half pound of supporting weight costs 6.3 cents. At 300,000 units, that is $18,900.

• **Aids Part Selection** — Critics might say there's little reason to bother with such tables because supporting weight isn't added to a

Materials in Typical Compact Car

	%
Steel	64.8
Iron	13.7
Glass	4.6
Rubber	4.5
Zinc	1.2
Aluminum	1.0
Copper, lead	1.8
Plastics	0.7
Miscellaneous	7.7

Source: Ford Motor Co.

Compacts Lower Weight Of 'Average' Car

Model Year	Weight (pounds)
1961	3,880
1960	4,150
1959	4,300
1958	4,230
1957	4,120
1956	4,100

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car all at once. It builds up over several years as field tests show that overweight in one part calls for a beefing up of other components to maintain quality. But it's obviously expensive to redesign for weight control after a car is in production. Formulas like these can be a practical aid in selecting materials and in evaluating different components before designs are completed. Here are two examples Messrs. Terry and Artinian use to show how their tables work.

1. Should you use aluminum or malleable iron for a steering gear housing? Either will do the job. The iron housing weighs 14 lb more than the aluminum, but its piece cost is $1.10 less, using regular cost formulas. However, when you apply the cost-weight formula, the net cost of the cast iron version would result in a $1 penalty instead of a $1.10 saving.

2. It's proposed that 20 lb of sound deadening material be added at a cost penalty of 95 cents. It might be acceptable on a quality basis, but the new formula shows that the total cost penalty really would be $2.95 per car.

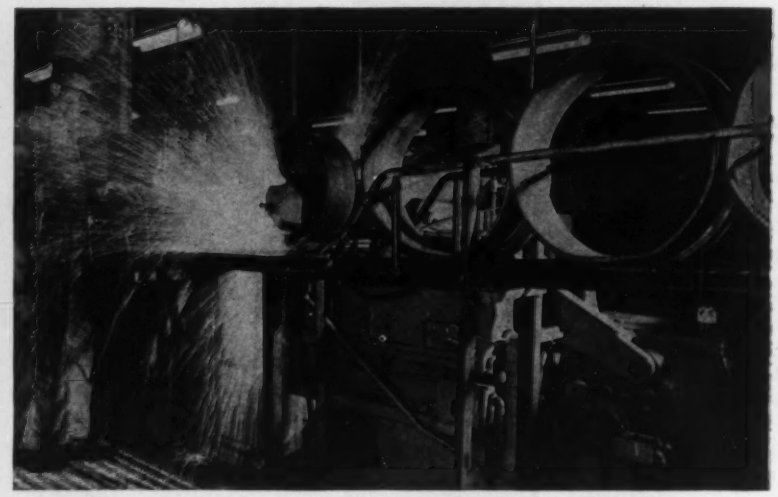
Mr. Terry is in product planning; Mr. Artinian is a section supervisor, cost presentations. Their system conceivably can be applied to other manufactured products to cut weight.

U. S. Auto Output

Passenger Only	1961	1960
January	414,498	688,731
February	364,397	659,323
March	.....	654,242
April	.....	582,909
May	.....	611,226
June	.....	613,147
July	.....	434,377
August	.....	305,527
September	.....	407,685
October	.....	617,816
November	.....	597,132
December	.....	522,239
Total	.....	6,694,354

Week Ended	1961	1960
Feb. 18	76,523	158,898
Feb. 25	100,331	153,501
Mar. 4	92,024	138,513
Mar. 11	91,202	145,967
Mar. 18	70,918†	145,852
Mar. 25	84,000*	137,385

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.



Welding lines, other equipment installed as . . .

Budd Moves Its Auto Division Headquarters to Detroit

BUDD CO., Philadelphia, has moved its automotive division headquarters and additional manufacturing operations into Detroit. Explains Edward G. Budd Jr., president: "The importance of our newly reorganized automotive division dictates that its headquarters and executive staff be located close to our automotive customers." Budd adopted a divisional structure three years ago.

About 75 per cent of the company's business comes from automotive sales. It makes wheels, rims, brakes, frames, and body stampings. Plants are in Philadelphia, Gary, Ind., and Detroit. The 2 million sq ft Detroit plant accounts for 35 to 40 per cent of the automotive division's business, reports Gilbert F. Richards, automotive sales vice president. He adds that incoming part releases indicate a slight upturn in April car production, but declines to estimate how much (indications are it will be less than 10 per cent).

• **Capital Spending**—Although employment probably won't increase immediately, the company is spending $7 million this year to add manufacturing operations and increase the Detroit plant's productivity.

"If we are successful we probably will bring in even more work," says Mr. Budd. The automotive division spent $3.5 million last year to modernize its Gary and Philadelphia facilities.

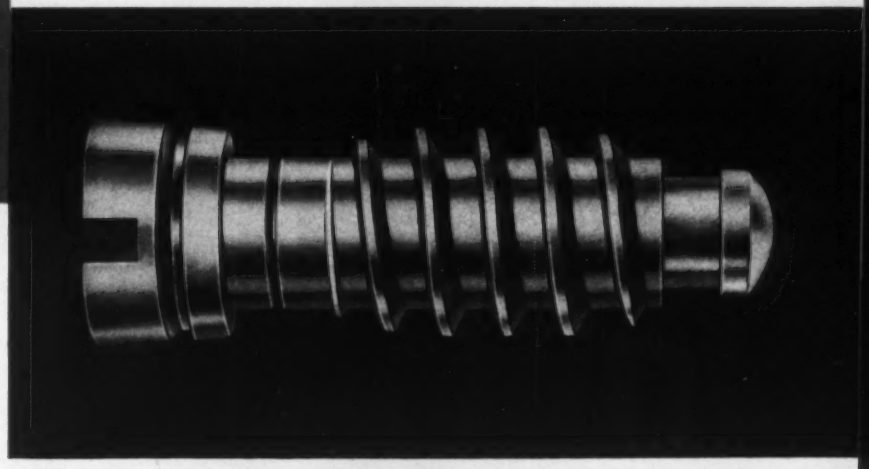
The company has just installed $1.6 million worth of truck rim fabricating equipment at Detroit—it was moved from Cleveland when Budd bought the Cleveland Welding Div. of American Machine & Foundry Co. The rim line has been set up in an area of the plant formerly devoted to making Thunderbird car bodies. Budd lost the T-bird business this year when Ford pulled it into its captive plant at Wixom, Mich.

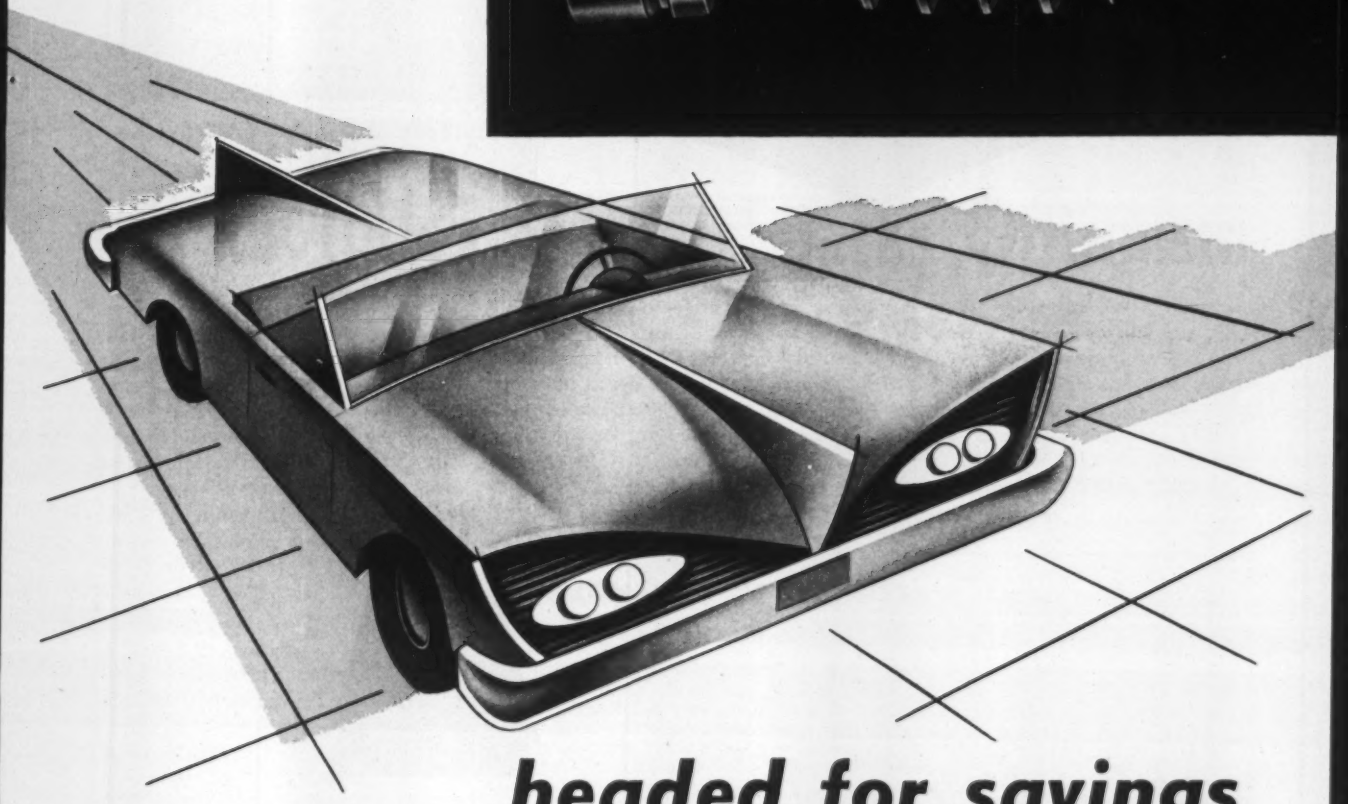
Another $3.8 million is going into a third automated casting line in the Detroit brake drum foundry. It will be operational in June.

The line will be fed from a 9 ton induction furnace with an hourly capacity of 23 tons. Two of the foundry's four melting cupolas are being rebuilt, so they can be switched from acid to basic iron operations with carbon block base. They'll have a 70 ton capacity.

The changes in the cupolas and the induction furnace installation give Budd one of the few noncaptive automotive foundries equipped to handle nodular iron.

approved by the automotive INDUSTRY





headed for savings

Like many industries, the automobile industry is seeking ways to combat foreign competition. With the cost of raw material and labor firmly fixed, automotive design engineers are seeking ways to increase fabrication speed and thereby reduce cost. They, like many others, are finding the answer to fastener design problems in cold headed parts. Cold heading provides the speed in manufacture essential to low production cost combined with flow strength which can only be maintained when all of the material is cold formed rather than partially cut away. If you are seeking ways to produce quality fasteners at less cost and eliminate the material waste and slow production time found in screw machine parts, why not call the man from GLS? Let him show you how we can cold head quality into precision fasteners for you at less cost. *We're headed for savings.*

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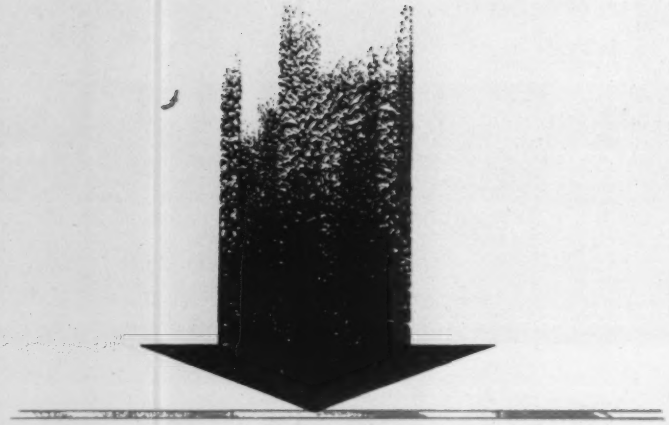

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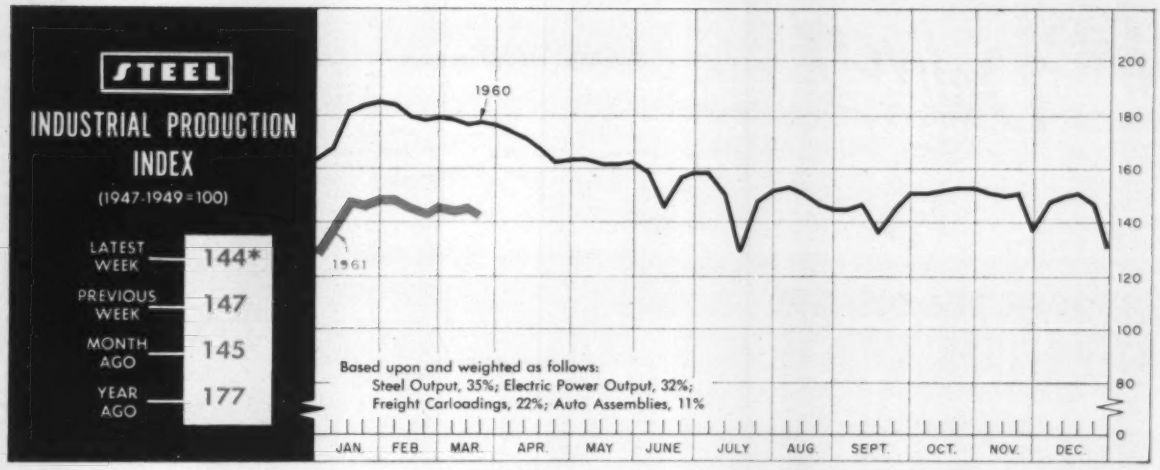

*Week ended Mar. 18.

FRB Index Holds, Sparks Optimism

THE FEDERAL Reserve Board index of industrial production stayed frozen at 102 per cent (1957=100) during frigid February for the second consecutive month. That development, combined with the fact that STEEL's industrial production index remains relatively strong in March, supports the belief that the recession has bottomed out.

● **Trend Encouraging**—The indexes have coincided rather closely through the years. The slight increase in the average of STEEL's index (above) during February presaged the firm showing of the FRB barometer.

And, historically, the trend set by the FRB indicator during the first two months has continued into March. The present stability could foreshadow the upturn businessmen are hoping for.

Nevertheless, some sources believe the drop in auto production will cause a dip in the FRB index. The estimated 3 point drop in STEEL's index for the week ended Mar. 18 is due almost completely to wholesale shutdowns in autodom for inventory adjustment. However, sales appear to have perked up enough to inspire enthusiasm among automakers.

● **Auto Optimism Sparked**—Chrysler has made a 25 per cent upward revision in its projected March passenger car output. Ben D. Mills, Ford's vice president and general manager of Lincoln-Mercury Div., says: "The recession has bottomed out at an annual production rate of 600,000 cars above the low point in the 1958 recession. This year it looks as though the auto industry may lead the nation out of the slump, largely due to the sales of compact cars." Increasing optimism, notes Mr. Mills, stems from the stabilization of used car prices

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)	1,574[1]	1,574	2,597
Electric Power Distributed (million kw-hr)	14,200[1]	14,356	14,109
Bituminous Coal Output (1000 tons)	6,110[1]	6,175	8,054
Crude Oil Production (daily avg—1000 bbl)	7,300[1]	7,353	7,116
Construction Volume (*ENR*—millions)	$382.4	$365.3	$374.1
Auto, Truck Output—U. S., Canada (*Ward's*)	100,724[1]	121,520	183,575
TRADE			
Freight Carloadings (1000 cars)	490[1]	493	581
Intercity Truck Tonnage (changes from year ago)	−5.7%	+3.5%	+0.4%
Business Failures (Dun & Bradstreet)	318	408	290
Currency in Circulation (millions)[2]	$31,901	$31,794	$31,726
Dept. Store Sales (changes from year ago)[2]	+9%	+26%	−7%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$28,669	$28,736	$26,445
Federal Gross Debt (billions)	$290.4	$290.5	$290.4
Bond Volume, NYSE (millions)	$38.9	$48.9	$25.3
Stocks Sales, NYSE (thousands of shares)	26,461	29,026	12,948
Loans & Investments (billions, adjusted)[3]	$108.8	$109.6	$102.2
U. S. Govt. Obligations Held (billions)[3]	$30.0	$30.3	$25.1
PRICES			
STEEL's Finished Steel Price Index[4]	247.82	247.82	247.82
STEEL's Nonferrous Metal Price Index[5]	213.2	212.5	231.3
All Commodities[6]	119.9	119.7	120.0
Commodities Other than Farm & Foods[6]	128.1	128.1	128.7

*Dates on request. [1]Preliminary. [2]Federal Reserve Board. [3]Member Banks, Federal Reserve System. [4]1935-39=100. [5]1936-39=100. [6]Bureau of Labor Statistics Index, 1947-49=100.

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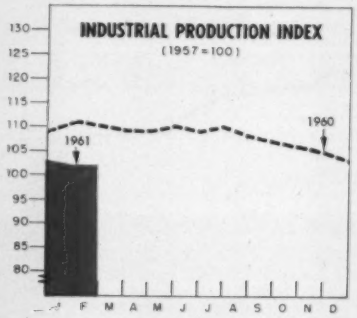
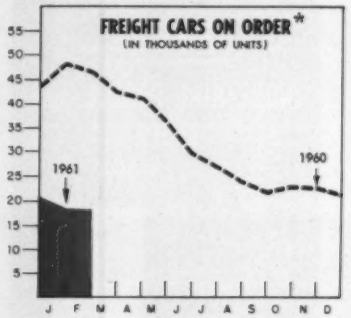
THE BUSINESS TREND





(Seasonally adjusted)

	Total Production		Total Mfg.		Durables Mfg.	
	1961	1960	1961	1960	1961	1960
Jan.	102	111	101	112	95	111
Feb.	102	110	101	110	95	109
Mar.	...	109	...	110	...	108
Apr.	...	109	...	109	...	106
May	...	110	...	110	...	107
June	...	109	...	110	...	105
July	...	110	...	110	...	106
Aug.	...	108	...	108	...	104
Sept.	...	107	...	107	...	102
Oct.	...	106	...	106	...	101
Nov.	...	105	...	104	...	98
Dec.	...	103	...	103	...	96
Avg	...	108	...	108	...	109

Federal Reserve Board. *Preliminary.
Charts copyright, 1961, STEEL.

	Domestic Awards		Backlogs (end of month)	
	1961	1960	1961	1961
Jan.	1,339	5,749	18,894	48,170
Feb.	1,536	3,480	18,429	45,323
Mar.	....	2,007	.....	42,131
Apr.	....	5,352	.....	41,003
May	....	2,285	.....	36,106
June	....	316	.....	29,555
July	....	1,331	.....	26,658
Aug.	....	1,333	.....	23,866
Sept.	....	2,206	.....	21,662
Oct.	....	5,864	.....	22,900
Nov.	....	3,740	.....	22,781
Dec.	....	2,705	.....	21,070
Total	....	36,368		

*Domestic only.
American Railway Car Institute.

and a dip in used car inventories.

Those cheering signs lead Mr. Mills to predict that Ford's production in the second quarter will be 25 per cent higher than the first quarter's. He thinks 427,500 vehicles will be made during the period. In fact, observes the Ford executive, "our preliminary orders for April indicate that our current schedules may be too modest. We may have to revise them upward."

The truck market is also registering noticeable improvement.

• **Steel Orders Climb** — Prospects for the steel market also appear to be improving, although operations have not reflected the upturn. New orders are reported to be rising. And a gradual, orderly uptrend in buying is anticipated.

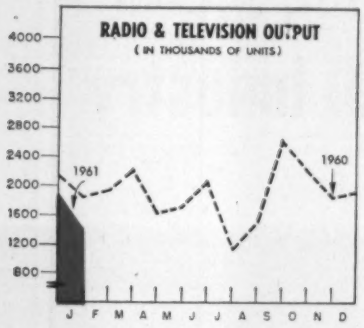
• **Downtrends Scarce**—While the level of business leaves much to be desired, downtrends are getting hard to find. Seasonally adjusted unemployment has been steady since December. Employment in nonmanufacturing industries has even gained slightly.

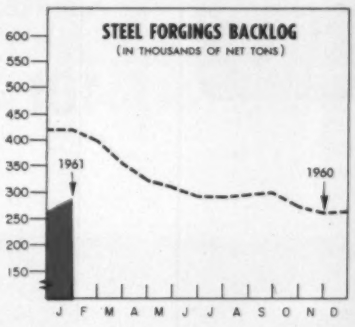
Retail sales picked up in February and have continued to edge up so far this month.

Little change was noted in the production of materials or the output of finished products by the Federal Reserve Board in February. Among consumer goods, increases in television sets, radios, and some appliances were offset by further declines in autos and furniture. Although durable goods slipped, iron and steel production kept gaining.

• **No Reason For Gloom** — Although the sixties have been disappointing so far, the National Association of Credit Management, New York, declares: "We continue to believe that business in the decade ahead will approximate what the optimists of 1959 predicted. The nation's economy paused for a breather in these last few months. There is certainly no reason for gloom."

NACM continues: "Plans for plant and equipment expenditures for 1961 are running only 3 per cent below the 1960 level. Business volume for the first quarter, as measured by gross national product, will be at an annual rate of about $502 billion. Expectations for 1961 as a whole call for a rise of 2 per cent over 1960 for a total of $515 billion."





	Radio		Television	
	1961	1960	1961	1960
Jan.	1,090	1,356	368	526
Feb.	....	1,442	....	503
Mar.	....	1,668	....	550
Apr.	....	1,230	....	423
May	....	1,277	....	442
June	....	1,551	....	519
July	....	890	....	269
Aug.	....	1,018	....	462
Sept.	....	1,915	....	679
Oct.	....	1,728	....	590
Nov.	....	1,469	....	430
Dec.	....	1,522	....	405
Totals	....	17,126	....	5,708

Electronic Industries Association.

	Shipments		Unfilled Orders	
	1961	1960	1961	1960
Jan.	100	123	289	420
Feb.	....	130	....	398
Mar.	....	138	....	356
Apr.	....	117	....	325
May	....	110	....	312
June	....	110	....	295
July	....	79	....	295
Aug.	....	88	....	299
Sept.	....	94	....	302
Oct.	....	97	....	277
Nov.	....	93	....	265
Dec.	....	90	....	268

U. S. Bureau of the Census. Data based on reports from commercial and captive forge shops with monthly shipments of 50 tons or more.

Foreign Car Sales Steady

Sales of new imported cars showed signs of steadying in February, reveals *Ward's Automotive Reports*. The trend offers good reason to believe that sales of leading imports in early 1961 will hold near the 1960 yearend level, says *Ward's*. The figures indicate foreign volume of nearly 375,000 in 1961, a decline of about 124,000 units from the 1960 mark.

Retail sales by Opel, Vauxhall, British Ford, Taunus, Metropolitan, Simca, Volkswagen, Renault, and Mercedes-Benz scored a 1.4 per cent gain in February over the January level—18,928 cars were sold. So the nine makes are exceeding or staying abreast of their December performances. They account for 70 per cent of the imported car market.

• **1960 Sales Slump**—*Ward's* final tally of 1960 registrations shows: The total for new, foreign passenger cars slid 18.8 per cent, from 614,131 in 1959 to 498,785.

Thanks to Volkswagen, West Germany was the only one of five major European sources to increase unit car sales in the U. S. last year. The Germans claimed 44.4 per cent of the foreign car sales in this country during 1960 compared with 33.7 per cent in 1959. Great Britain was second, garnering 21 per cent vs. 32.1 per cent in 1959. France was third with 19.4 per cent. It took 23.1 per cent of the market in 1959. Italy, Sweden, and Japan followed in that order. All others totaled only 0.3 per cent.

• **Breakdown**—Here's how the top ten foreign makes wound up last year:

	New Car Registrations	
	1960	1959
1. Volkswagen	159,995	120,442
2. Renault	62,772	91,073
3. Opel	25,553	39,802
4. English Ford	23,602	42,512
5. Fiat	20,773	38,468
6. Triumph	17,720	23,072
7. Simca	17,077	35,190
8. Austin Healey	16,322	16,592
9. Mercedes-Benz	14,435	13,744
10. Volvo	13,926	18,533

Construction 9% Over '60

Mass housing starts provided the bounce that turned heavy construction contracts upward this week to $382.4 million. New business for the first 11 weeks this year totaled $4.2 billion, a 9 per cent boost over the comparable period of last year, reports *Engineering News-Record*.

QUANTITY PRODUCTION OF GREY IRON CASTINGS

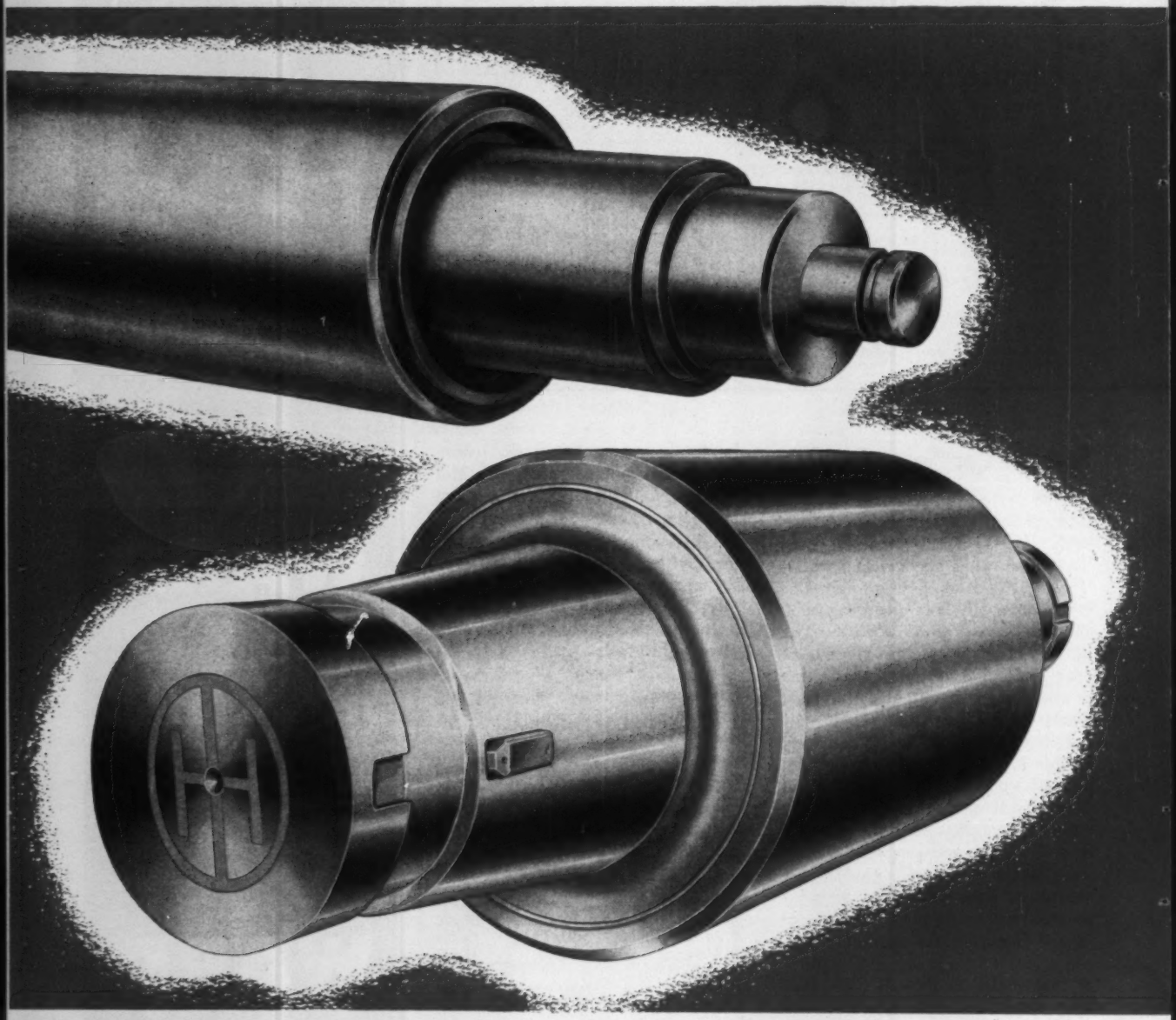
ONE OF THE NATION'S LARGEST AND MOST MODERN PRODUCTION FOUNDRIES

ESTABLISHED 1866
THE WHELAND COMPANY
CHATTANOOGA 2, TENN.

WARD
For Countless Uses
of
SPRING STEEL
AMERICA'S LEADING SUPPLIER
Where
SERVICE and QUALITY
is the rule
WARD STEEL CO.
Boston—Cambridge, Mass.
Chicago, Ill.—Greensboro, N. C.

Ohio Rolls

Shaping Metal for all Industry



THE OHIO STEEL FOUNDRY COMPANY
LIMA, OHIO

OHIO IRON and STEEL ROLLS

Carbon Steel Rolls	Flintuff Rolls	Denso Iron Rolls
Ohioloy Rolls	Double-Pour Rolls	Nickel Grain Rolls
Ohioloy "K" Rolls	Chilled Iron Rolls	Special Iron Rolls
Nioloy Rolls	Forged Steel Rolls	

PLANTS AT LIMA AND SPRINGFIELD, OHIO. *. Virtually at the center of the Steel Industry*

OR-47

JOHN W. WOLCOTT
Disston gen. mgr.

FRANCIS H. GERLACH
DeWalt eng. v. p.

EDWARD B. PILCHER
National Carbon gen. wks. mgr.

ERNST WIEDMANN
Oilgear v. p.-engineering

John W. Wolcott was appointed general manager, **Disston Div.**, Pittsburgh, H. K. Porter Company Inc. He was plant manager in charge of manufacturing at the Cleveland Div. of Weatherhead Co.

Charles E. Heitman Jr. was elected a vice president, **Bendix Corp.**, Detroit, and a member of its administration committee. He continues as group executive in charge of Bendix Products Div., South Bend, and Sheffield Corp., subsidiary at Dayton, Ohio, as well as Sheffield's associated companies.

Boyce Adams was made sales manager for **Omnitronics Inc.**, Philadelphia, subsidiary of Borg-Warner Corp. He was president of Wayne Kerr Corp.

Larry Nelson was named chief engineer, **W. W. Sly Mfg. Co.**, Cleveland. He will also supervise the Customer Service Dept.

Harold H. Trautman was appointed vice president-general manager, **Lake Shore Steel Co. Inc.**, Detroit. He recently resigned from Plymouth Steel Corp.

Samuel D. Saul was elected executive vice president of **Plasteel Products Corp.**, Washington, Pa. He was general sales manager.

George W. Schuler was made plant superintendent at **Rodney Davis Gear Co.'s** new plant in Philadelphia. **Edward C. Robson** was made office manager for the company.

Francis H. Gerlach was elected vice president-engineering at **DeWalt Inc.**, Lancaster, Pa. He previously held a similar position at Porter-Cable Machine Co., Syracuse, N. Y.

Edward B. Pilcher was named general works manager, **National Carbon Co.**, division of Union Carbide Corp. He has headquarters in Cleveland.

Louis J. Olson was named general manager of **Harvill Corp.'s** newly acquired Femco Div., Redondo Beach, Calif. **Norman F. Singer** was made general manager, American Aerophysics Corp., subsidiary acquired by Harvill last January.

Richard A. Dobrein, former sales manager, **U. N. Alloy Steel Corp.**, was elected executive vice president of Western Wire Corp. of Boston, a division.

John R. Baker fills the new post of director of planning for **MB Electronics**, New Haven, Conn., division of Textron Electronics Inc.

James R. Dissette was made manager of **Bohn Aluminum & Brass Corp.'s** Plant 12, South Haven, Mich. He succeeds **Edward N. Harris,** recently elected vice president-sales.

Anaconda Aluminum Co., Louisville, appointed three new marketing managers: **G. Roger Smith Jr.** in charge of mill products; **J. E. Bouhl,** foil products; and **Arthur W. Mengel,** containers and chef-foil products. **William R. Cory** was named field sales manager.

Ernst Wiedmann, recently appointed director of engineering, **Oilgear Co.**, Milwaukee, was promoted to vice president-director of engineering.

Robert C. Palmer resigned as president of **Ingalls Iron Works Co.**, Birmingham. **J. B. Kopp,** former vice president-operations, was promoted to executive vice president.

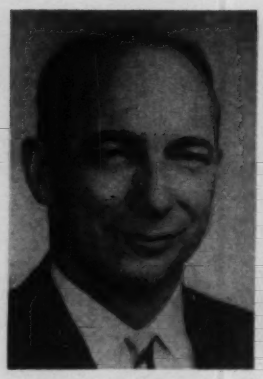
Ernest R. Howard was made manager; **Raymond M. Sears** senior applications engineer of a newly created Thermostat Metals Application Engineering Dept. of **Metals & Controls Inc.**, Attleboro, Mass.

F. Leonard Bryant was elected president of **Hooker Chemical Corp.**, New York, to succeed **Thomas E. Moffit,** elected chairman and chief executive officer. **Thomas F. Willers** succeeds Mr. Bryant as executive vice president.

Donald R. File was made manager of the Rochester, Pa., plant of **Dravo Corp.'s** Keystone Div.

MITE Corp., New Haven, Conn. (newly formed by merger of Greist Mfg. Co., New Haven, and Teleprinter Corp., Paramus, N. J.), elected five vice presidents: **Rodman A. St. Clair,** vice president-manufacturing; **Pelton Phelps** and **Ralph M. Hirsch,** vice presidents-marketing; **Bernard Howard,** vice president-research and development; and **James E. Lockwood,** vice president-treasurer.

Dr. John A. F. Gerrard was made director of electronics engineering



CHARLES G. MACKIE

EDWARD A. SMITH

Chicago Screw product engineering posts

HAROLD O. KRON

WILLIAM T. BROWN

vice presidents of Philadelphia Gear Corp.

for **Bendix-Pacific Div.**, North Hollywood, Calif., Bendix Corp.

Chicago Screw Co., Bellwood, Ill., division of Standard Screw Co., appointed **Charles G. Mackie** to the new post of chief engineer in charge of new products development, and promoted **Edward A. Smith** to chief product engineer in charge of production engineering and estimating.

Frank C. Senior was elected vice president - operations for **Strategic Materials Corp.**, New York. He was general manager of the company's Sumac metallurgical plant at Niagara Falls, Ont.

William C. Nusbaum was elected vice president of **Day-Brite Lighting Inc.**, St. Louis. He was assistant to the president, Emerson Electric Mfg. Co., parent company.

John B. Balmer was elected president and chief executive officer of **Murray Corp. of America**, Pittsburgh. He was president of John Wood Co.

Philadelphia Gear Corp., King of Prussia, Pa., named **Harold O. Kron** vice president-engineering, and **William T. Brown** vice president-manufacturing. Mr. Kron was chief engineer. Mr. Brown was plant manager.

Bernard J. Bartnicki joined **Tuthill Pump Co.**, Chicago, as purchasing agent. He previously served more than ten years as production manager and material controls supervisor of Howard Foundry Co.

Leo W. Tobin Jr. was made executive assistant to **John Dykstra**, vice president-manufacturing, **Ford Motor Co.**, Dearborn, Mich.

Jonathan Smith was appointed vice president-sales, **Sunbeam Equipment Corp.**, Meadville, Pa. He was project manager.

Robert L. Aughenbaugh was named manager-manufacturing for heat processing equipment at **General Electric Co.'s** Industrial Heating Dept., Shelbyville, Ind. He was manager of manufacturing engineering for the department.

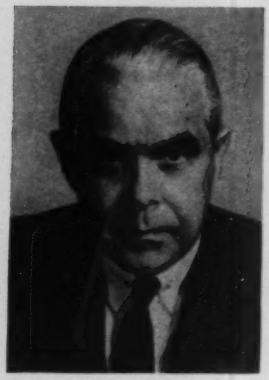
William J. Jenkins was named sales manager, Bucket Div., Erie, Pa., **Erie Strayer Co.** He replaces **Charles Polinek**, who resigned to become product manager, Bucket Div., Blaw-Knox Co.

Frank M. Precopio was named manager of engineering, Wire & Cable Dept., Bridgeport, Conn., **General Electric Co.** He succeeds the late **Lyde E. Howard.**

L. B. Geithman was named general sales manager, Metals Processing Div., Buffalo, **Curtiss-Wright Corp.**

Charles M. Ruprecht succeeds **W. A. Vormehr**, resigned, as vice president-manufacturing, **Hussmann Refrigerator Co.**, St. Louis.

John P. Henebry was named to the new post of director of the Water Div. of **Fairbanks, Morse & Co.**, Chicago. The division manufac-



JOHN B. BALMER

Murray Corp. of America pres.

JONATHAN SMITH

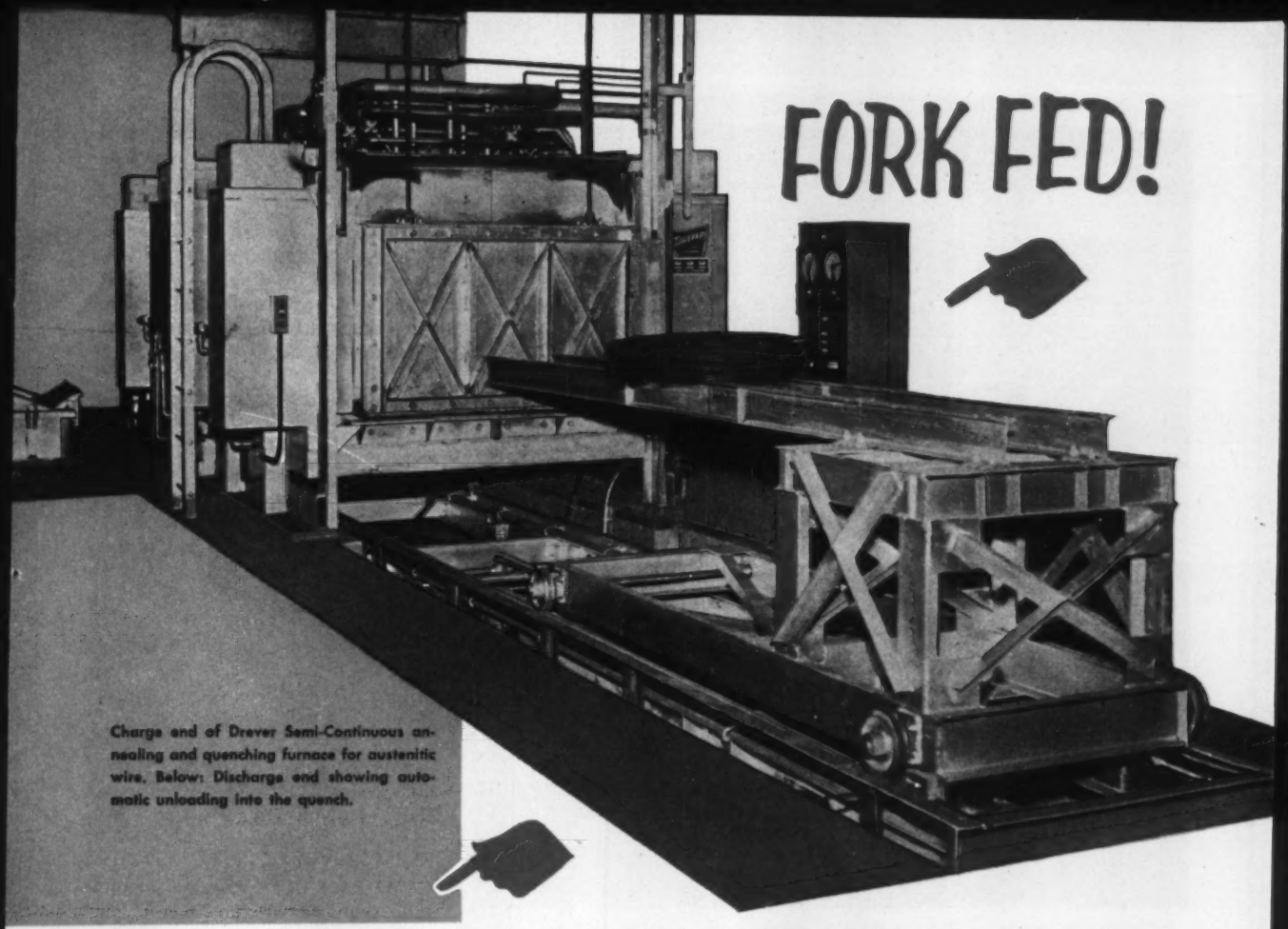
Sunbeam v. p.-sales

ROBERT L. AUGHENBAUGH

GE heat processing mfg.

JOHN P. HENEBRY

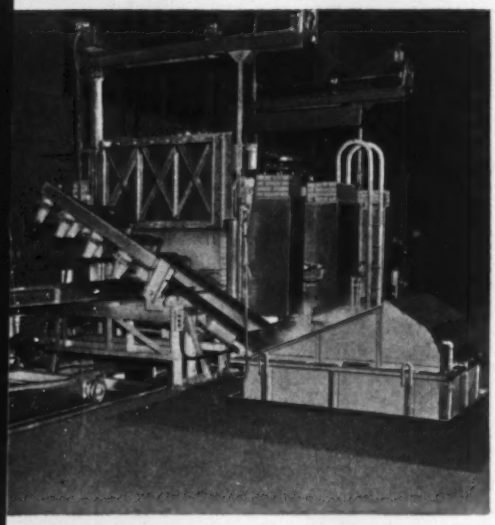
Fairbanks Water Div. dir.



Charge end of Drever Semi-Continuous annealing and quenching furnace for austenitic wire. Below: Discharge end showing automatic unloading into the quench.

DREVER STAINLESS WIRE COIL ANNEALERS

For semi-continuous annealing and quenching



A push of a button after the operator has placed the coil on the charging fork sets off the complete automatic operation of this Drever Furnace handling austenitic stainless steel wire in coils. It is Drever engineered to process coils through both furnace and quench on the basis of a short heating cycle and minimum scale build up.

DREVER ADVANCED ENGINEERING

Complete heat treating systems that can meet today's higher and higher requirements for product quality combined with the economic necessity for semi-continuous or completely continuous operation, demand the design knowledge of highly specialized engineers. The Drever engineering staff has had extensive experience in every phase of industrial furnace engineering.

DREVER ENGINEERING FOR YOU

Your own requirements in industrial furnaces may be far afield from that shown here but you might want to consult with our engineers. Write or phone us. Drever Company, Bethayres, Pa. Wilson 7-3400.

DREVER INDUSTRIAL FURNACES

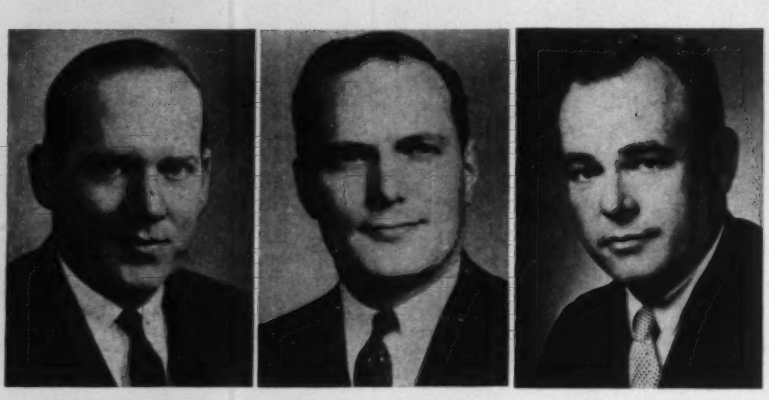
ENGINEERED TO YOUR PARTICULAR REQUIREMENTS

ENGINEERING AND MANUFACTURING FACILITIES AROUND THE WORLD THROUGH ASSOCIATES IN FRANCE, GREAT BRITAIN, GERMANY, ITALY, JAPAN AND INDIA

HARRY J. JACOB JR.
Auto-Load chief eng.

WALTER S. WINIARCZYK
CF&I plant gen. supt.

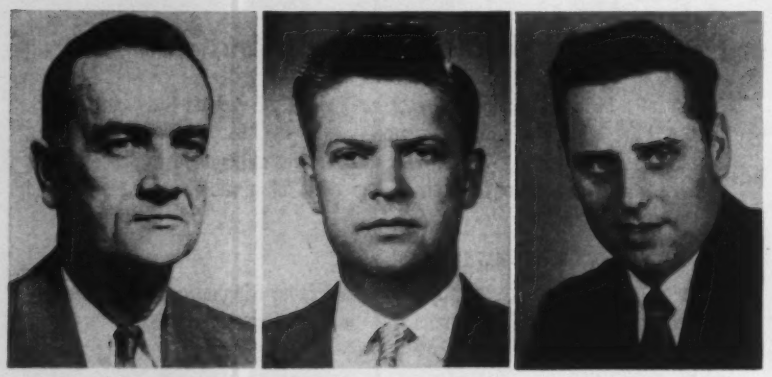
DONALD J. SCHWALM
Holcroft chief metallurgist



ROBERT B. PARKER
Hoover Bearing materials dir.

MYRON A. ANGIER
Remington-Univac sales

C. W. BENT
Clark Equipment sales post



JOHN F. GALBRAITH
Linde electric welding mgr.

A. N. KAUFMAN
Arnolt v. p.-mfg.

HAROLD F. GRIFFITHS
Federal Tool sales mgr.

tures and will market machines for desalting sea water.

John F. Galbraith was made manager, electric welding development and planning, **Linde Co.**, New York, division of Union Carbide Corp. He is succeeded by **W. H. Helmbrecht** as manager of the Electric Welding Development Laboratory.

A. N. Kaufman was promoted to vice president-manufacturing for the six plants of **Arnolt Corp.**, Warsaw, Ind. He was vice president-general manager of the Indianapolis plant. **H. M. Henderson** was named vice president-general sales manager.

Harold F. Griffiths was appointed sales manager, **Federal Tool & Mfg. Co.**, Minneapolis.

Harry J. Jacob Jr. was made chief engineer, **Auto-Load Machine Co.**, Belleville, Mich.

Walter S. Winiarczyk was appointed general superintendent of the Buffalo plant of **Colorado Fuel & Iron Corp.** **Kenneth L. Welling** was made district sales manager, Spokane district.

Donald J. Schwalm was named chief metallurgist for **Holcroft & Co.**, Detroit. He has served as metallurgist at the company since 1949.

Robert B. Parker was named director of materials; **Gerald A. Graham** production control manager, Hoover Bearing Div., Ann Arbor, Mich., **Hoover Ball & Bearing Co.** Mr. Parker replaces **James Veras**, assigned duties at the Cuyahoga Steel & Wire Co., a division in Maple Heights, Ohio.

Myron A. Angier was named general sales manager, **Remington Rand Univac Div.**, Sperry Rand Corp., in New York.

C. W. Bent was appointed product sales manager of attachments and container handling equipment for Industrial Truck Div., Battle Creek, Mich., **Clark Equipment Co.**

W. F. Girouard was made director of industrial engineering at **Librascope Div.**, Glendale, Calif., General Precision Inc.

OBITUARIES...

Herman Merker, 63, chairman, **Pressed Steel Tank Co.**, West Allis, Wis., died Mar. 14.

James M. Straub, 61, president, **Fort Pitt Bridge Works**, Pittsburgh, and president of the **American Institute of Steel Construction**, died Mar. 14.

Robert J. Roberts, 56, assistant general superintendent, **Midwest Steel Corp.**, Portage, Ind., died Mar. 15.

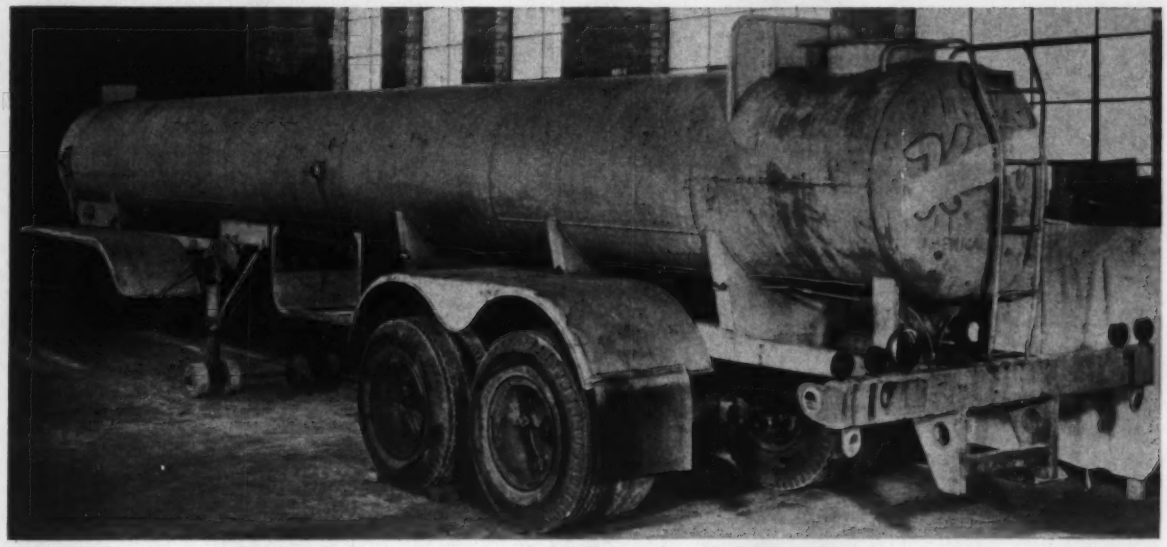
Jack G. Howe, 50, plant representative at Houston for **National Supply Div.**, Armco Steel Corp., died Mar. 11.

Robert E. Carnahan, assistant manager, district sales, **Great Lakes Steel Corp.**, Ecorse, Mich., died Mar. 9.

HERECROL

REG. U. S. PAT. OFF.

SYNTHETIC RUBBER COATING FOR STEEL



Trailer Tank lined with HERECROL RC-31 Rubber Coating.

HERECROL RC-31 LATEX COATING

Patent Application Pending

A NEW ACID AND ALKALI RESISTANT COATING FOR—

Trailer Tanks — **Storage Tanks**

Tank Cars — **Fans and Blowers**

Duct Systems — **Pipes and Fittings**

Industrial Equipment

Bulletin #104 will be mailed if requested on your letterhead.

HERESITE & CHEMICAL COMPANY

MAIN OFFICE & PLANT — MANITOWOC, WIS.

EASTERN WAREHOUSE — WOODBRIDGE, N. J.

EASTERN SUBSIDIARY

GENERAL COATING, Inc. — WOODBRIDGE, N. J.

Canada: Dominion Rubber Company, Ltd. Montreal, Quebec

"BEST BY ANY TURNING TEST"
in the toolroom and on the production line. Write to Dept. 710 for complete information and performance data.

Jones & Lamson turret lathes are BUILT and POWERED TO PRODUCE

MORE CHIPS per tool
MORE PIECES per hour
MORE PROFIT per job . . . than any turret lathe of comparable size!

JONES & LAMSON

the man who needs a new machine tool is already paying for it

JONES & LAMSON MACHINE COMPANY, 517 Clinton St., Springfield, Vt., U.S.A. J&L MACHINE TOOL DIV.

Kaiser Develops Aluminum Source for Pacific Market

KAISER Aluminum & Chemical Corp. and Consolidated Zinc Proprietary Ltd. are creating a major source of aluminum in the Australia-New Zealand area. The two firms each hold 50 per cent interest in the $300 million Comalco Industries Pty. Ltd., which was formed in November, 1960, to establish an integrated aluminum complex.

Says Kaiser president, D. A. Rhoades: "The location of the resources, which will be developed in this venture, provides many economic advantages, and production operations will be ideally situated to serve word markets, particularly those rapidly developing in the Pacific area. We believe consumption will more than double in this area by 1970."

The new industrial facilities and the development of bauxite and hydroelectric resources will be a significant contribution to the economies of New Zealand and Australia, and it is expected that fabricating operations will be stimulated in those countries.

Major Comalco projects scheduled for completion by mid-1966 are:

- Development of bauxite reserves in Weipa area on Cape York Peninsula, Australia.
- Construction of a 403,000 ton alumina refinery at Weipa.
- Expansion of the Bell Bay, Tasmania, aluminum reduction works to at least 31,000 tons of aluminum per year.
- Development of a hydroelectric power source in New Zealand, using waters of Lakes Te Anau and Manapouri.
- Construction of an aluminum reduction works at Bluff, New Zealand, which will have a capacity of 134,000 tons of primary aluminum annually.

In keeping with plans to develop fabricating facilities in this area, Comalco has acquired the aluminum fabrication operations of Austral Bronze Co., Australia. The move includes the aluminum extrusion operations of Austral Bronze and the sheet rolling facilities which are under construction at Yennora, near Sydney. The acquisition and expansion of facilities will cost $14.5 million.

Plant Changes Hands

Johnson & Hoffman Mfg. Corp., Mineola, N. Y., has purchased the inventory, machinery, and equipment of the Stamping Div., Fred Goat Co. Inc., Brooklyn, N. Y. The plant will be operated as the Brooklyn Div.

Columbium Mill Planned

St. Lawrence Columbium & Metals Corp., Toronto, Ont., will build a concentrator for the treatment of columbium ore in the parish of Announciation du Lac, Two Mountains, Que. The firm's process will make possible recovery of concentrates having a grade of at least 50 per cent. The concentrate will average 9 to 10 lb of columbium pentoxide per ton. Mill capacity: 500 tons a day.

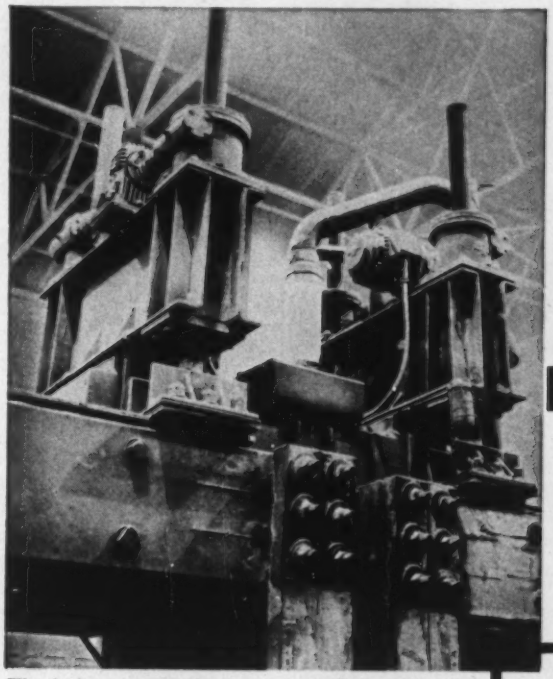
Forms Electronics Div.

Emerson Electric Mfg. Co., St. Louis, has established an Industrial Electronics Div. to design and manufacture precision electronic control devices and systems. The division owns U. S. manufacturing rights to industrial electronic control equipment developed by Lancashire Dynamo Electronic Products Ltd., England. G. H. Prudent is manager of the division, which is under the supervision of W. L. Davis, executive vice president of Emerson Electric.

F. J. Stokes Ltd. Formed

F. J. Stokes Corp., Philadelphia, established a subsidiary, F. J. Stokes Ltd. with headquarters in London, England. James T. Davies

(*Pleaose turn to Page* 104)



100 million pounds per year

That's how much aluminum a modern reduction plant equipped with 1000 Cone-Drive **double-enveloping worm** gearmotors produces. Gearmotors control anodes and casings on the electric furnaces. Ambient temperatures to 300° F and constant reversing are encountered.

Versatile Cone-Drive gearing is available in gearsets, speed reducers and gearmotors.

CONE-DRIVE GEARS

DIVISION MICHIGAN TOOL CO.
7171 E. McNichols Rd., Detroit 12

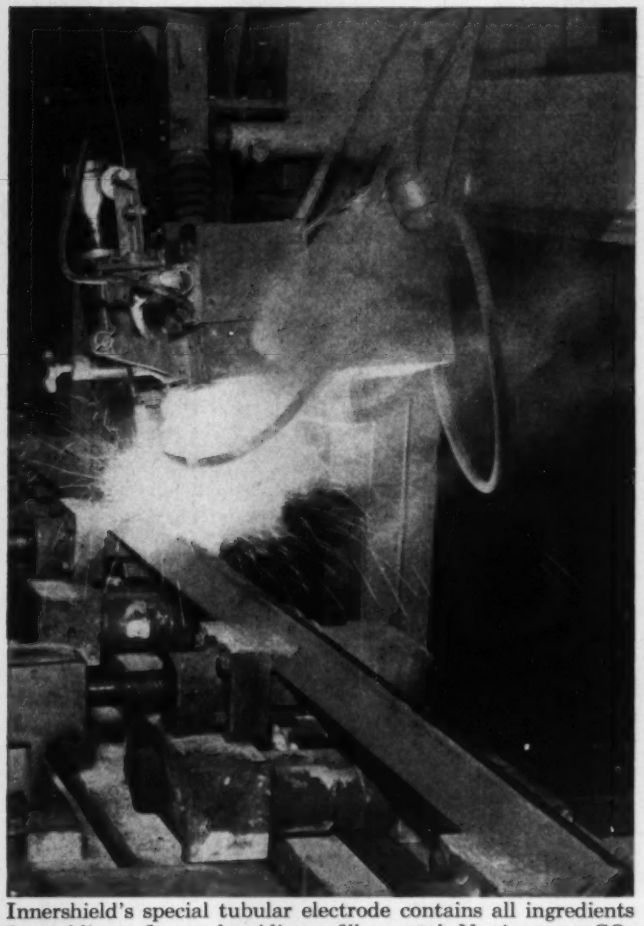
Leading automaker saves because . . .

INNERSHIELD ELIMINATES

Two Innershield heads moving horizontally with two moving elliptically weld brackets to rear axle in 4½ seconds. No separate flux or gas systems needed.

COSTLY FLUX HANDLING

Lincoln's new Innershield process is clean. No need for expensive flux handling and recovery systems. No abrasive dust to wear out costly, complex fixtures. Atmosphere stays cleaner, simplifies housekeeping, improves working conditions. No slag removal problems.



Innershield's special tubular electrode contains all ingredients for welding—fluxes, deoxidizers, filler metal. No Argon or CO_2 needed. Here, Innershield welds angle iron for farm machinery part at 80 ipm compared to 40 ipm with CO_2. Tanks, hoppers, structural beams all are now welded with this process, too.

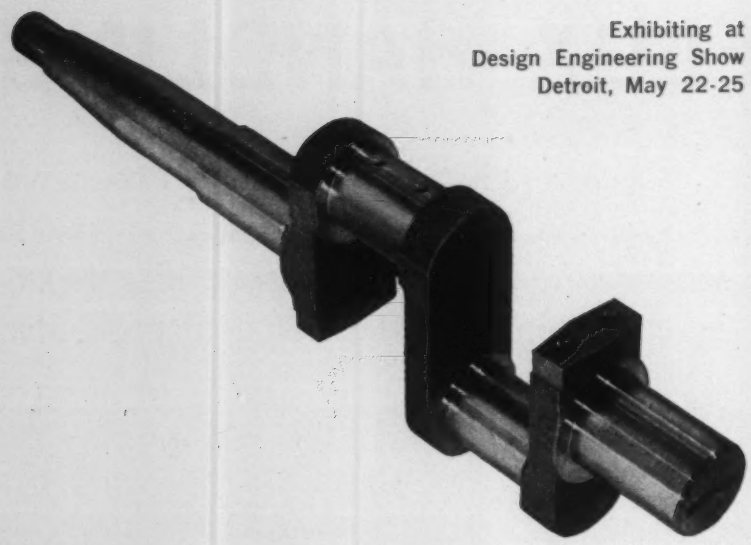
Semi-automatic Innershield Squirt lets an amateur turn pro in minutes. Electrodes bridge gaps caused by poor fitup. Slag flicks off with a swipe of the electrode tip. Have a Lincoln field engineer show you how Innershield Squirt can increase the operating factor and deposition rates on your jobs.

New brochure describing Innershield process and full and semi-automatic equipment is just off the press. Get your copy now. Write The Lincoln Electric Company, Dept. 2931, Cleveland 17, Ohio.

LINCOLN WELDERS

THE WORLD'S LARGEST MANUFACTURER OF ARC WELDING EQUIPMENT AND ELECTRODES

Exhibiting at
Design Engineering Show
Detroit, May 22-25



DUCTILE IRON SAVED MONEY

This seventy pound ductile iron crankshaft was made for air compressors manufactured by The Brunner Division of Dunham-Bush, Inc. The increased loads and impact resistance called for by new compressor design specifications required rigidity and strength beyond the limits of the cast iron alloy shafts formerly used. Ductile iron was chosen because the rigidity, yield strength and wear characteristics comfortably exceed operating requirements.

A major cost advantage was realized in this case. Hamilton Foundry used existing pattern equipment made for the gray iron crankshafts in the switch to ductile iron. This saved the cost of new foundry patterns and the greater cost of dies needed for steel forgings. Dunham-Bush achieved a major improvement in product performance for the modest additional cost of the metal in the castings.

When new and unusual design problems arise in the selection of metal and the casting of parts, you will find that the skill and integrity of your foundry is your best insurance that specifications—and delivery schedules—will be met.

GRAY IRON • ALLOYED IRON • MEEHANITE® • DUCTILE (NODULAR) IRON • NI-RESIST • DUCTILE NI-RESIST • NI-HARD

HAMILTON FOUNDRY INC.

1551 LINCOLN AVENUE • HAMILTON, OHIO • TWinbrook 5-7491

(*Concluded from Page* 101)

has undertaken general management of operations for the new enterprise. Products of the parent firm include automatic plastics molding equipment and other high speed, automatic machinery for making pharmaceutical tablets, powder metal parts, and other products.

Spending Boosted 70%

General Electric Co. plans to invest $13.6 million in plant improvements and equipment (a 70 per cent increase over last year) for operations in the Syracuse, N. Y., area.

New Company Is Formed

A. Englander, president of Empire Steel Corp., Denver, has formed Columbine Pipe & Tube Co. Anticipated investment is $250,000. A division of the new firm, Columbine Supply Co., will stock supplies for builders and contractors.

Oxygen Supply Increases

Linde Co., a division of Union Carbide Corp., has been awarded a contract to supply 350 tons a day of high purity oxygen for Great Lakes Steel Corp.'s expanding operations at Ecorse, Mich. That is in addition to the 500 tons a day it now supplies. Most of the new supply will be used in Great Lakes's basic oxygen converter shops, scheduled for completion in mid-1962.

Thor Forms New Division

Thor Power Tool Co., Aurora, Ill., established an Electronics Tooling Div. under the supervision of H. F. Wilson. Initial tools to be developed will be used for making solderless wire wrapping connections.

Foreign Contracts Booked

Amsler Morton Co., Pittsburgh, has received several contracts for the design and engineering of soaking pits in foreign countries. Included are: A two pit installation for South African Iron & Steel Co. Ltd., Pretoria, South Africa; a two pit installation for Sumitomo Metal Industries Ltd., Kokura Works,

UNBREAKABLE!

This is a punishing test for a hack saw blade. We do it to prove that a Marvel High-Speed-Edge Hack Saw Blade is unbreakable. A Marvel Blade can be bent like this thousands of times and it still won't break.

Why? Because the blade body—to which a high speed steel cutting edge is welded—is made of a tough, non-brittle alloy steel designed to take the heaviest feed pressures and highest speeds any modern hack sawing machine can develop.

What does this unbreakable feature of Marvel Blades mean to you?

1. Operators, knowing they can trust Marvel Blades not to break, tension them truly taut (from 200% to 300% more than ordinary blades) to produce maximum obtainable accuracy of saw cut.
2. They can safely apply heavier feed pressures and higher speeds without endangering themselves or the machine to produce faster cutting-off.
3. Longer cutting life is assured because the blade simply won't break.

Ask for Marvel High-Speed-Edge Hack Saw Blades by name and you can be sure you're getting the unbreakable blades designed to give you maximum accuracy, speed, and safety in your cutting-off operations. Leading Industrial Distributors have Marvel Blades in stock.

MARVEL *Metal Cutting* **SAWS**

BETTER MACHINES
BETTER BLADES

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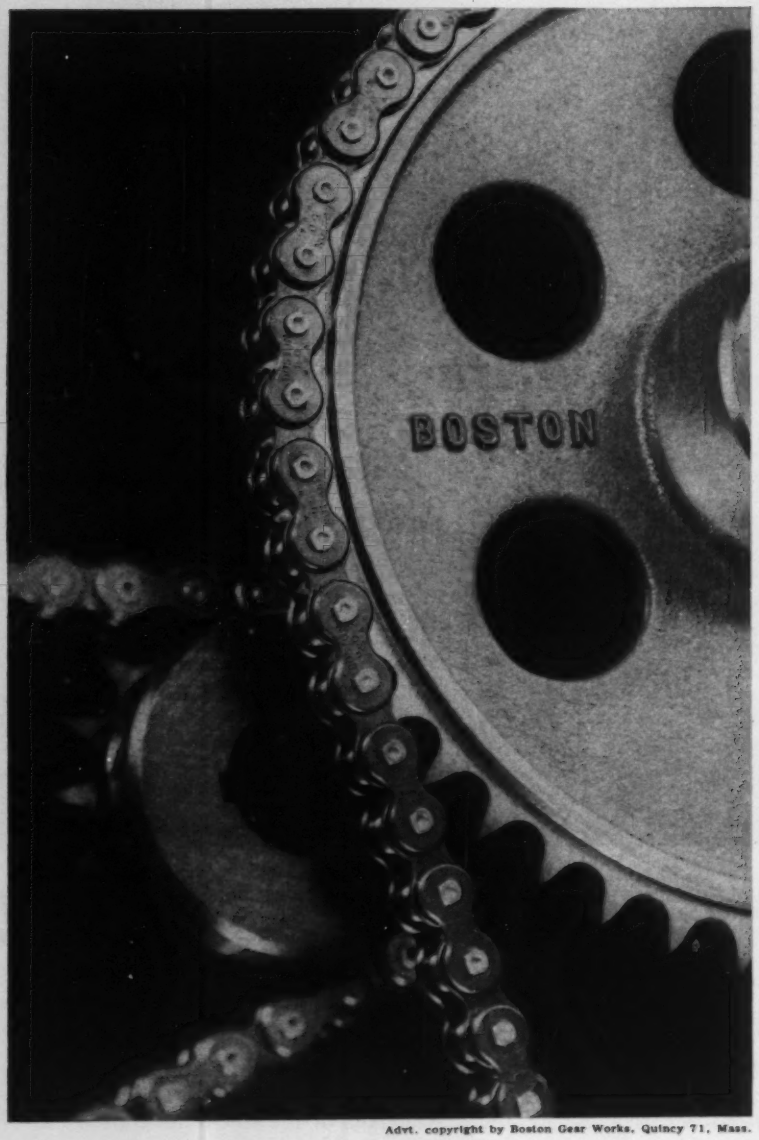
B-1128

BOSTON Gear® QUALITY

sprockets and chain



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1488 types and sizes. From local stock.
Off the shelf - at factory prices.
For any chain drive 1/4" to 2" pitch -
Roller, Block, Ladder. See Catalog 57.
Design around the quality leader.

BOSTON Gear®

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Japan; and a nine pit installation for Nisshin Steel Works Ltd., Nanyo Works, Japan. The Japanese contracts will be completed in co-operation with Ishikawajima-Harima Heavy Industries Co. Ltd., Tokyo, Japan.

Howe Sound Joins Units

Howe Sound Co., New York, formed Howe Precision Co. as an electronics hardware producer. The new division will combine the production facilities of: Royersford Precision Products Co. (precision metalworking); Karl Lieberknecht Inc. (textile machines and components); Bard Mfg. Co. (hardware, ground pins and bushings, railroad and rapid transit parts); and Werner Foundry & Machine Co. (metal castings). The manufacturing plant and offices of Howe Precision Co. are in Royersford, Pa.; foundries are in Lansdale and Fair View Village, Pa.

Pipkorn Enlarges Plant

W. E. Pipkorn Mfg. Co. has doubled the floor space of its plant at 2211 W. County Rd., St. Paul 12, Minn., to 12,800 sq ft. The firm expects to triple its output of formed wire products, custom wire fabrications, and production aids.

MITE Corp. Organized

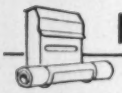
MITE Corp. has been incorporated with administrative headquarters at 446 Blake St., New Haven, Conn. (Initials in the corporate name stand for "miniature industrial technical equipment.") Greist Mfg. Co., New Haven, and Teleprinter Corp., Paramus, N. J., have been merged into the MITE Corp. Greist Mfg. is the manufacturing division, specializing in metal stampings and machine assemblies. Greist's subsidiary, Air-Marine Motors Inc., Amityville, N. Y., makes subfractional motors and associated assemblies. Teleprinter is the research and development division of MITE Corp.

Officers are: President, H. S. Stone Jr.; secretary, J. W. Cooper; vice president and treasurer, J. E. Lockwood; vice presidents, Marketing Div., Pelton Phelps and R. M. Hirsch; vice president, Research & Development Div., Bernard How-

ard; vice presidents, H. M. Greist Jr. and R. J. Blinken.

St. Mary Mfg. Expands

St. Mary Mfg. Corp., North Tonawanda, N. Y., acquired the Special Tooling Div. of the Pivot Punch & Die Corp., Tonawanda, N. Y. Paul P. Gruber is vice president in charge of manufacturing.



NEW ADDRESSES

Long-Lok Corp., Santa Monica, Calif., moved to 4101 Redwood Ave., Los Angeles 66, Calif. The firm makes self-locking bolts and screws.

National Supply Div., Armco Steel Corp., will move its Chicago office to 20 N. Wacker Dr., that city, Apr. 1.

B. W. Rogers Co. moved to 1000 Brookpark Rd., Cleveland 9, Ohio.

NEW PLANTS

Reed Instrument Bearing Co., a division of SKF Industries Inc., is building a $2.5 million plant in Los Angeles. The 35,000 sq ft facility will enable the division to quadruple production. Reed is a major supplier to the missile, aircraft, and related instrumentation fields.

Kaiser Aluminum & Chemical Corp., Oakland, Calif., will build a major facility to manufacture tubular alumina at its Baton Rouge, La., Works. The plant will increase fivefold the corporation's capacity to produce the material.

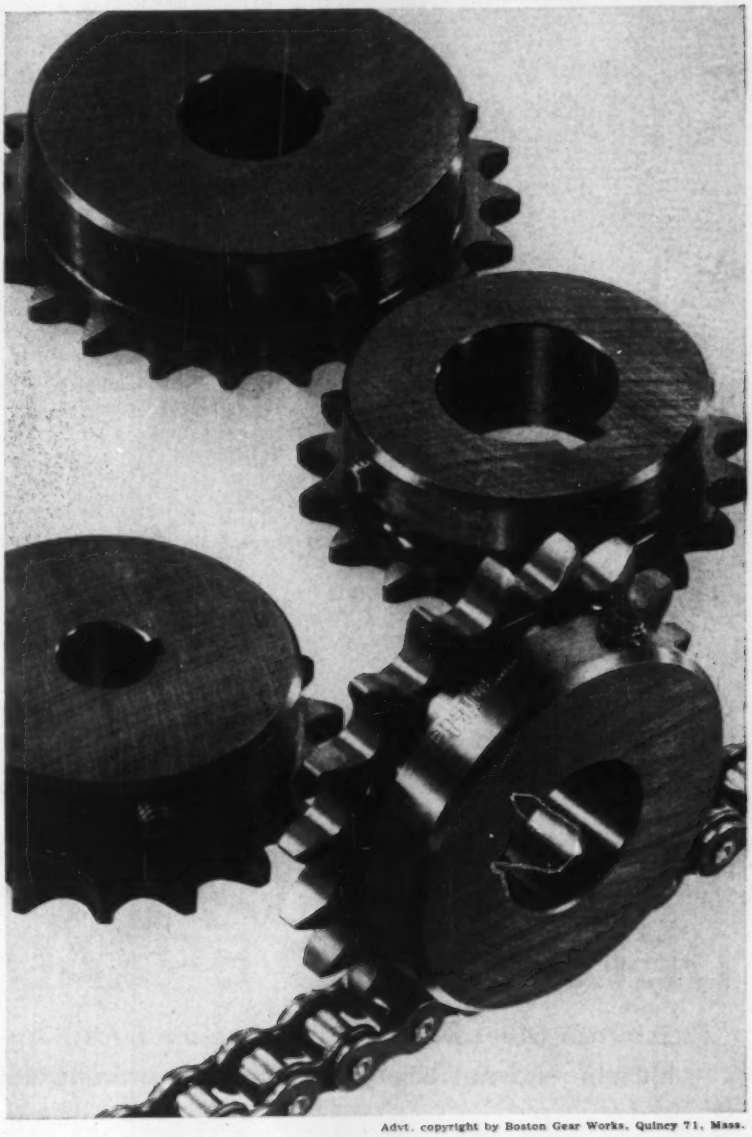
Air Reduction Sales Co., a division of **Air Reduction Co. Inc.**, New York, has opened air separation plants at Tampa, Fla., and Baton Rouge, La. Liquefied oxygen, nitrogen, and argon are being produced.

Eaton Ejes S.A.I.C., a subsidiary of **Eaton Mfg. Co., Cleveland**, will build an axle plant in Argentina. Initially, Eaton's investment in the facility will approximate $5 mil-

(*Please turn to Page* 110)

BOSTON Gear® QUALITY

bored-to-size pinions



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86 sprocket pinion sizes with 360 bore sizes.
From local stock. Ready to install.
Off the shelf – at factory prices.
Complete with keyway and set screw.
Save machining cost. See Catalog 57.

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. . . **Stacks of Nestaway racks** show nesting, interlocking and space-saving features of racks for baked goods handling made by Mid-West Metallic Products for its affiliate, Nestaway, Inc. Rack held by Harold W. Vetter (left), Mid-West director of manufacturing, and Robert J. Adams, purchasing agent, holds 12 loaves of bread and stacks 12 high on castered base. Rack uses up to 13.3 pounds of Pittsburgh Steel Co.'s bright basic wire.

DELIVERING BREAD—BY WIRE

Pittsburgh Steel wire's uniform welding, forming properties give Mid-West Metallic extraordinary success in the manufacture of Nestaway racks

Bread and pastries are delivered better by wire. That is, by welded steel wire racks that perform double duty in handling and selling baked goods.

Mid-West Metallic Products, Inc., a fast-growing subsidiary of Rubbermaid, Inc., uses Pittsburgh Steel Company's bright basic wire to build wire shipping racks for its affiliate, Nestaway, Inc., another Rubbermaid subsidiary. In addition to the Nestaway racks, Mid-West makes more than 300 other wire formed products, using Pittsburgh Steel's bright basic and galvanized wire in a wide range of sizes.

The Nestaway racks, however, are a prime example of Mid-West's experience in using Pittsburgh Steel's .3625 and .3065 bright basic wire.

The racks are part of a complete Nestaway system for baked goods handling to and at the point of sale. The system includes interlocking wire racks, rack shelves and caster bases. It eliminates nearly all direct handling of baked goods between bakery and consumer.

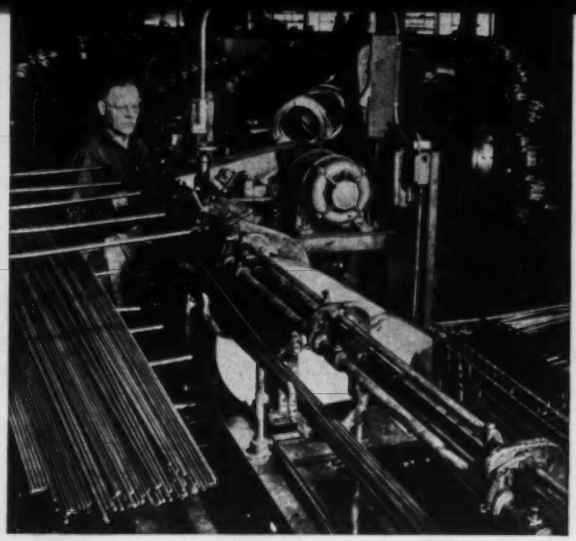
To build the Nestaway racks, Mid-West uses automated and semi-automated forming and welding equipment of its own design. This equipment requires wire with the highest possible uniform physical properties. Mid-West depends on Pittsburgh Steel for much of its wire supply because it is assured consistent, uniform quality.

• **Phenomenal Welding Success** —Made in 11 sizes ranging from 8.4 to 13.3 pounds in weight, an average Nestaway rack requires 200 welds.

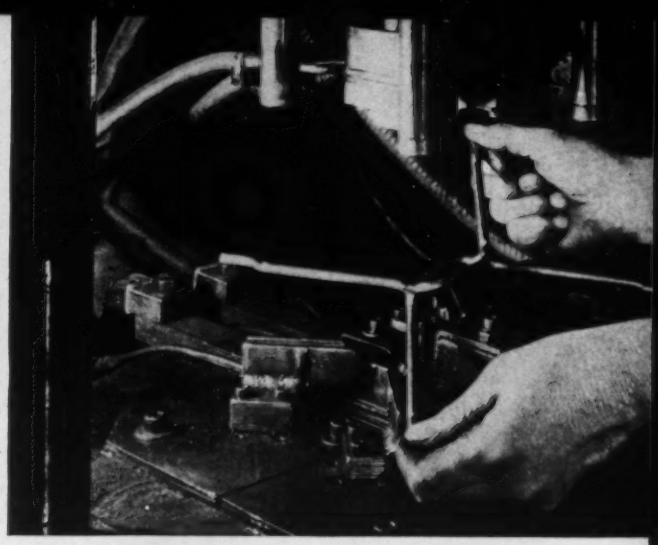
On welding, Harold W. Vetter, Mid-West's director of manufacturing, says:

"In all of our production last year, we had an extraordinarily low number of broken welds. We've had racks returned that had been accidentally crushed by trucks—but the welds were seldom broken."

Purchasing Agent Robert J. Adams adds further evidence of the



. . . **From straightening and cutting** through final copper-nickel-hard chrome plating, Pittsburgh Steel's wire meets Mid-West Metallic's requirements for consistent uniformity of forming, welding, coating properties.



. . . **Key piece of rugged Nestaway rack**—the bends and welds on "X"-shaped side supports are produced to tolerances of plus/minus .015 inch by Mid-West Metallic with Pittsburgh Steel's .3625 bright basic wire.

weldability of Pittsburgh Steel's bright basic wire, saying:

"We found Pittsburgh Steel wire would consistently hold welds when we bend the welded ends of the rack's bottom frame to form Nestaway's interlocking feature."

• **Close Forming Tolerances**—Because Nestaway racks are built to stack when loaded and nest precisely when empty, wire bends are made to unusually close tolerances. Mr. Vetter explains:

"This rack is so accurately formed that it's practically a machined product. Every bend—even over-all dimensions and some welds—is held to a tolerance of .015 inch."

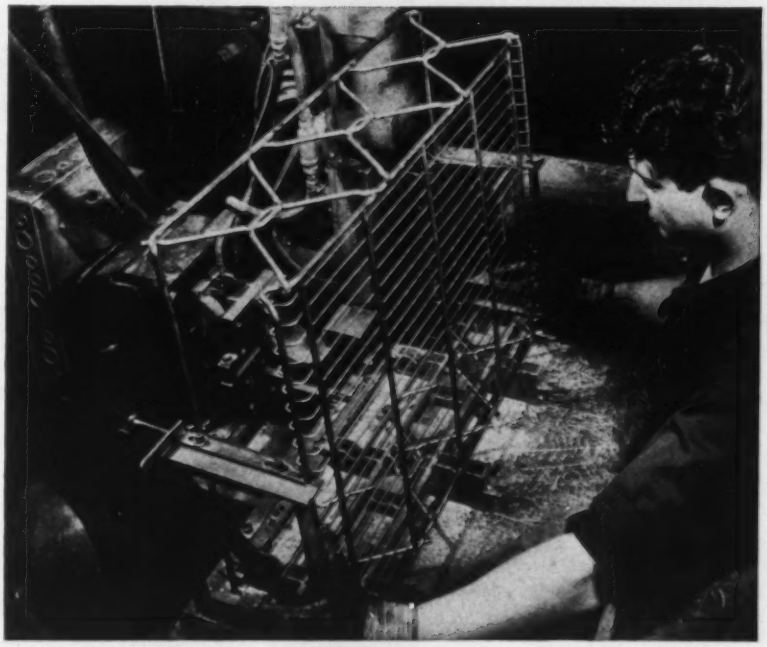
Surface finish of Pittsburgh Steel's wire is vital, too. After assembly, the rack is given a copper-nickel-hard chrome coating to provide a durable, attractive unit which meets strict standards of cleanliness.

Pittsburgh Steel's ability to supply wire with the consistent quality Mid-West Metallic requires is testified to by Purchasing Agent Adams. He says:

"Pittsburgh Steel furnishes us quality wire with uniform properties from shipment to shipment. Otherwise, we're in trouble on our automatic machines. We want wire that is weldable, formable and clean.

"Pittsburgh Steel has been able to give us what we want with consistency and we're extremely satisfied with the way its wire performs for us."

Take a lesson from Mid-West Metallic's experience. The benefits this progressive company gets from using Pittsburgh Steel's wire can be yours, too, whatever your application. Just contact one of the district offices listed at the right.



. . . **With 200 welds per rack** and a present capacity of more than 25,000 Nestaway racks per month plus component parts of the Nestaway System, Mid-West Metallic experiences very few broken welds in the course of a year. Credit goes to efficient equipment and wire quality. Nestaway rack is shown here in assembly before chrome plating. Mid-West, a subsidiary of Rubbermaid, Inc., looks to Pittsburgh Steel for bright basic wire and plain galvanized wire to make Nestaway racks and more than 300 other products at the new Cleveland, Ohio, plant.

Pittsburgh Steel Company

Grant Building • Pittsburgh 30, Pa.

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Chicago	Dallas	Detroit	New York	Tulsa
		Houston	Philadelphia	Warren, Ohio

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(*Concluded from Page* 107)

lion, including land, building, equipment, and inventories.

CONSOLIDATIONS

Shelburne Industries Inc., Burlington, Vt., purchased **C. B. Woodworth Corp.**, Greene, N. Y., and **Woodworth Specialties Corp.**, Binghamton, N. Y. Prior to acquisition of the two custom metalworking firms, Shelburne Industries was known as Alling Enterprises Inc. The Woodworth properties will be operated as the Woodworth Metal Fabricating Div. under the general managership of R. A. Woodworth.

Latrobe Steel Co., Latrobe, Pa., purchased a majority interest in **Cast Masters Inc.**, Racine, Wis., a foundry specializing in the production of large precision castings for the patternmaking and tooling fields.

Universal Match Corp., St. Louis, and **Universal Controls Inc.**, New York, will merge subject to approval of stockholders. Universal Match would be the surviving corporation.

Dorsett Electronics Inc., Norman, Okla., acquired **Speedster Inc.**, Denver, manufacturer of special purpose industrial heating elements and devices, institutional electric cooking equipment, and short run metal stampings. The Denver property will be operated as the Speedster Products Div. under the presidency of J. R. Kauffman.

FWD Corp., Clintonville, Wis., maker of heavy duty trucks, purchased **Wagner Tractor Co. Inc.**, Portland, Oreg., and renamed the firm FWD Wagner Inc.

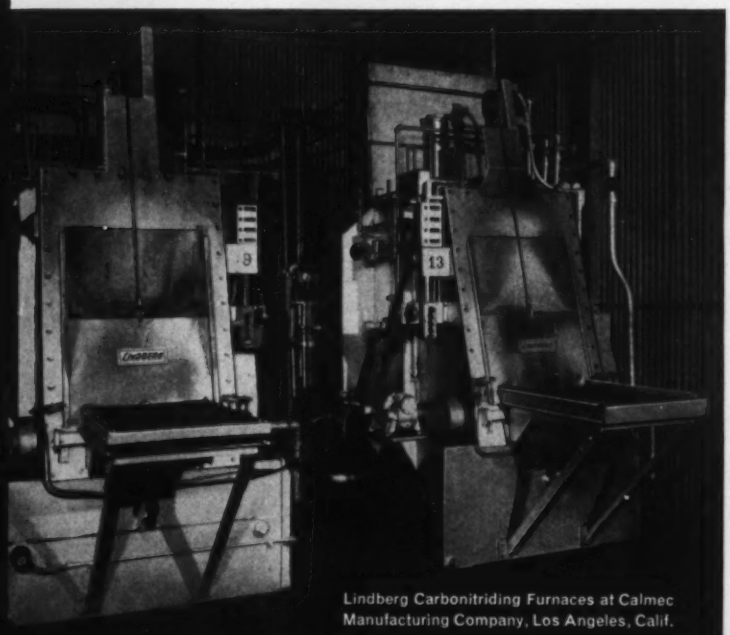
Pittsburgh Standard Conduit Co., Verona, Pa., acquired the principal assets of **Houston Plastic Bonding Co.**, Houston, and will operate the property as its Plasti-Bond Div.

Erie Forge & Steel Corp. will acquire **Continental Rubber Works**, Erie, Pa., subject to approval of stockholders.

J. F. McINTYRE tells why CALMEC always looks to Lindberg for heat treating equipment

Left, S. E. Summers, Chief Design Engineer and at right, J. F. McIntyre, Executive Vice-President, Calmec Manufacturing Company, Los Angeles. In the Middle, J. E. Krickl, Western Sales Manager, Lindberg Engineering Company.

"When we have heat treating problems we like to get the Lindberg man right in the middle of them. We know Lindberg men are heat treating experts and the best source we have for advice on the most practical and efficient equipment to satisfy any heat treating requirement. As a result we've bought lots of Lindberg equipment in the past few years. We like it and the fact that we are continuing to buy it proves that the Lindberg man's advice has been sound."

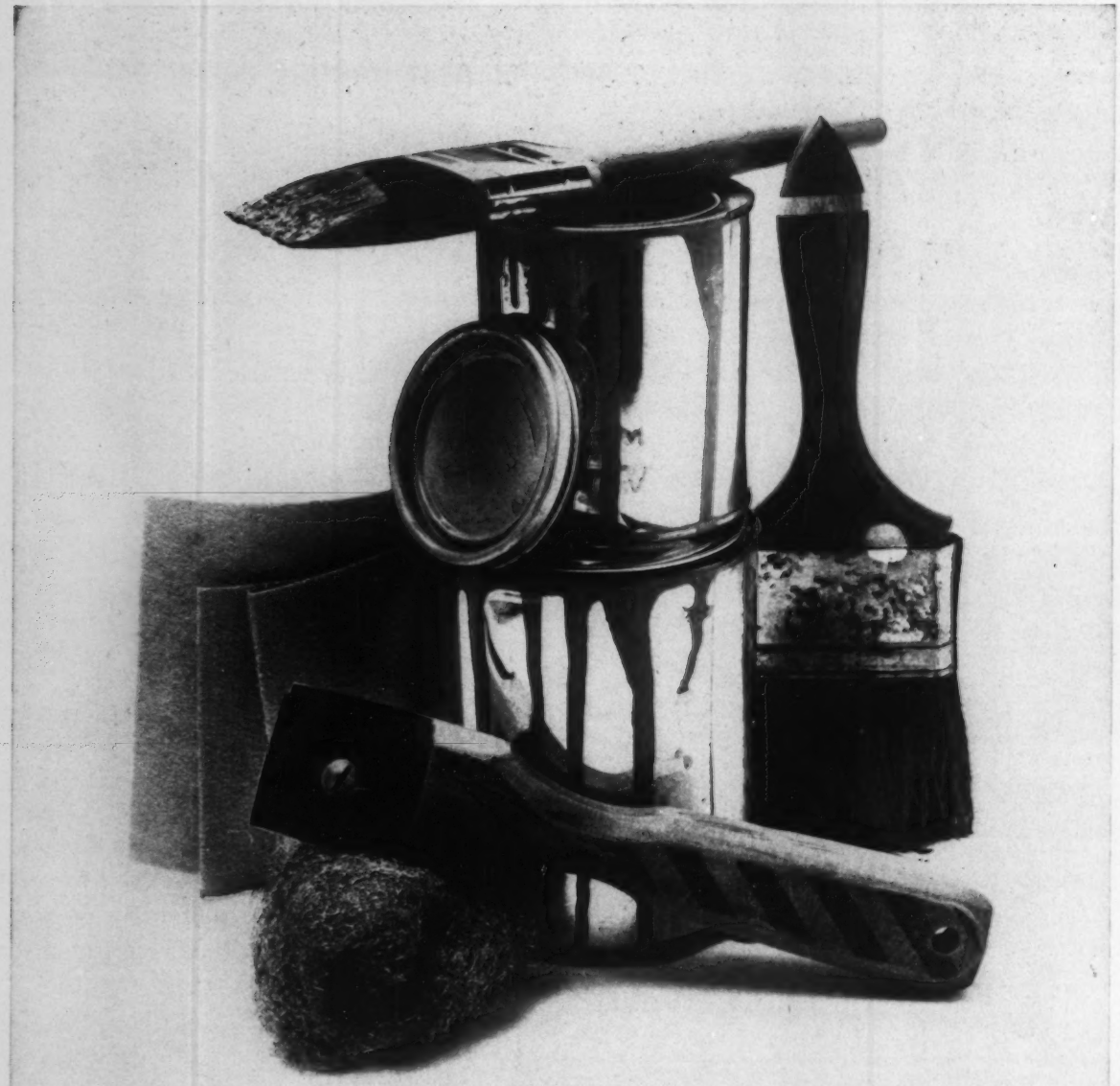


Lindberg Carbonitriding Furnaces at Calmec Manufacturing Company, Los Angeles, Calif.

Mr. McIntyre has certainly backed up the above words with deeds. Over the past few years, Calmec, a leading manufacturer of precision tools, parts and missile system components, has installed twelve electrically heated furnaces, six gas-fired furnaces and four atmosphere generators—all Lindberg! And we hope there are more to come. If you have any product or process in the metal or ceramic field requiring the application of heat it would be a good idea to get the Lindberg man in the middle right away. You can depend on his experienced help and Lindberg's engineering and design know-how to provide exactly the right equipment for your need. It's easy! Just get in touch with your Lindberg Field Engineer (see your classified phone book) or write us direct. Lindberg Engineering Company, 2441 West Hubbard Street, Chicago 12, Illinois.

Los Angeles plant: 11937 S. Regentview Avenue, Downey, California. In Canada: Birlefco-Lindberg Ltd., 15 Pelham Ave., Toronto 9, Ont. Also, Lindberg plants in Argentina, Australia, England, France, Italy, Japan, South Africa, Spain, Switzerland and West Germany.

LINDBERG
heat for industry



Who needs them anymore?

Certainly not the consumer who buys aluminum products. He doesn't need to scrape an aluminum boat or paint an aluminum lawn chair. But ease or total lack of need for maintenance is only one of the reasons more and more people are buying aluminum products. Olin Aluminum, through its engineering and design services, has helped many fabricators produce better aluminum products at far less cost. When these quality improvements and savings are passed on to the public, sales go up. Chances are, Olin can show you ways to save and translate new ideas into aluminum. Call your nearest Olin Aluminum Sales Office. The very latest technical help is on the way.

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STEEL
March 27, 1961

METALWORKING FACTS and FIGURES

13th ANNUAL EDITION

• Here's a storehouse of metalworking statistics for 1960 and prior years. It's a good place to get data on production, prices, earnings, labor, and many other facets of metalworking.

Additional bound copies of Metalworking Facts & Figures with heavy paper cover are available at $1 a single copy; prices for larger quantities on request. Write Reprint Department, STEEL, Penton Bldg., Cleveland 13, Ohio.

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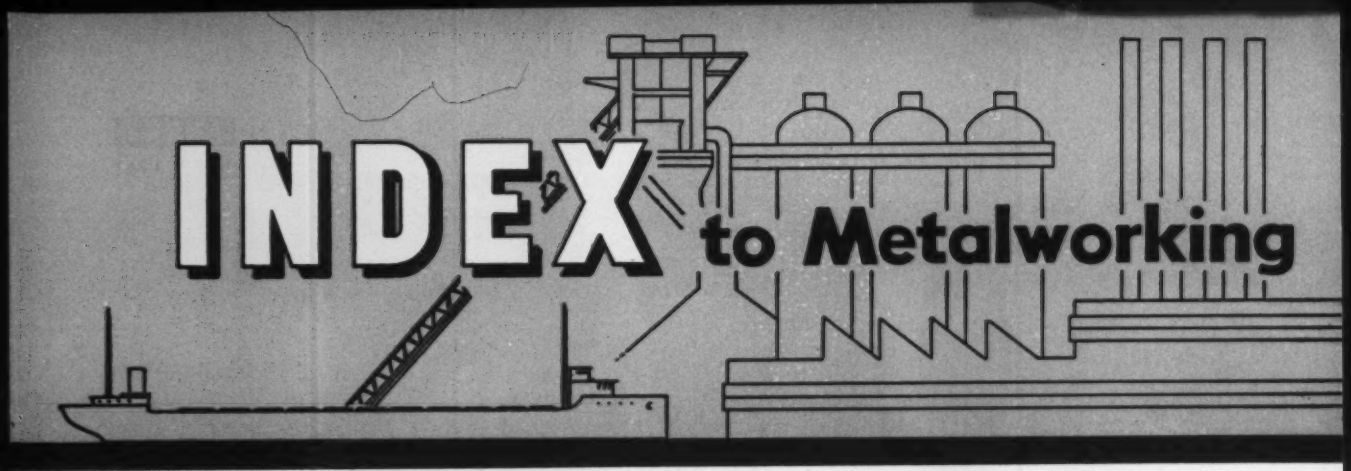


INDEX to Metalworking

Air Conditioning:
Central Systems S-26
Equipment S-26
Air Handling Equipment S-26
Air Washers S-26
Aircraft, Civil S-36
Aircraft Engines, Civil S-36
Alloy Steel Distribution S-10, S-11
Alloy Steel Production ..... S- 9
Aluminum:
Cans S-15
Castings S-14
Prices S-19
Production, Primary S-22
Production, Secondary S-22
Wrought Products S-22
Antimony Prices S-19
Antimony Statistics S-22
Appliances, Home. S-30, S-31, S-32, S-33
Arcwelding Sets S-29
Automobile Statistics S-35

Backlogs, Manufacturing S-43
Barrels and Drums, Steel S-15
Batteries, Shipments S-37
Bauxite: Imports, Production S-22
Bearings, Imports S-29
Bedsprings and Mattresses S-31
Bicycle Shipments S-35
Bituminous Coal S-47
Blowers S-26
Boilers:
Gas Fired S-30
Steel Power S-28
Brass:
Ingot Shipments S-20
Prices S-19
Bronze Prices S-19
Building Cost Index S-48
Bulbs, Electric S-31
Burners:
Conversion, Gas S-31
Oil S-31
Bus Shipments S-37
Business:
Failures and Liabilities S-44
New Incorporations S-44
Businesses in Operation S-44

Cabinets, Steel Kitchen S-32
Canadian Auto Production S-35
Cans:
Aluminum S-15
Tin Plate S-15
Carbon Steel Distribution S-10, S-11
Carloadings, Freight S-44
Castings:
Aluminum and Aluminum-Base Alloy S-14
Copper and Copper-Base Alloy .. S-14
Gray Iron S-12
High Alloy S-13
Iron and Steel S-13
Lead and Lead-Base Die S-14
Magnesium and Magnesium-Base Alloy S-14
Malleable Iron S-12
Nonferrous S-14
Steel S-13
Zinc, Zinc-Base Alloy S-14
Chrome Ore S-23
Cleaners, Standard Vacuum S-32
Closures S-15
Coal, Bituminous S-47
Coal Chemical Prices S-18
Cobalt Prices S-19
Coffeemakers, Electric S-32
Coke Prices S-16
Coke Production S-46
Conduit and Fittings S-28
Construction:
Contract Awards S-48
Cost Index S-48
Machinery S-28
New Houses S-48
New Plant, Equipment S-48
Put in Place S-48
Consumer Price Index S-39
Containers:
Aluminum Cans S-15
Steel Barrels, Drums, Pails S-15
Tin Plate Cans S-15
Control Apparatus, Industrial S-26
Convectors S-31
Conversion Burners S-31
Copper:
Castings S-14
Consumption in U. S. S-20
Exports S-20
Fabricators' Statistics S-20
Imports S-20
Prices S-19
Production S-20
Corn Poppers, Electric S-32
Corporate Finances S-45
Crowns, Shipments S-15

Debt, National S-45
Diecastings S-14
Diodes, Semiconductors S-34
Dishwashers, Electric S-32
Disposers, Waste Food S-33
Distribution:
Alloy Steel S-10, S-11
Carbon Steel S-10, S-11
Finished Steel S-10
Stainless Steel S-10, S-11
Dividends, Corporate S-45
Domestic Heating Stoves S-30
Drums, Steel S-15
Dryers, Clothes S-33
Duct Heaters S-31
Durable Goods:
Backlogs S-43
Inventories S-43
New Orders S-43
Production Index S-39
Sales (Production) S-43

Earth Moving, Excavating Equipment S-28
Electric Bulbs S-31
Electricity:
Output S-47
Production Capacity, U. S. S-47
Electrodes, Welding S-29
Electronic Components S-34
Electronic Equipment, Industrial .. S-34
Employment:
Metalworking S-5, S-40
Employment (continued)
Steel S-41
Total U. S. S-41
Engines, Diesel, Gas, Gasoline ... S-29
Expenditures:
New Plant, Equipment S-48
U. S. Government S-45
Exports:
Auto S-35
Bearings S-29
Iron and Steel ..... S- 7
Merchandise, U. S. S-44

Fabricated Metal Products:
Backlogs S-43
Inventories S-43
New Orders S-43
Production Index S-39
Sales (Production) S-4, S-43
Fabricated Structural Steel S-48
Failures, Business S-44
Fans S-26, S-32
Farm Equipment S-38
Fasteners, Industrial S-29
Fat Fryers, Deep S-32
Federal Reserve Board Production Indexes:
Durable Goods S-39
Industrial S-39
Manufacturing S-29
Metal Fabricating S-39
Primary Metals S-39
Ferroalloys, World Production .... S- 7
Ferrous Scrap S-46
Finances:
Corporate S-45
U. S. Government S-45
Fittings and Conduit S-28
Flat Irons, Electric S-32
Floor, Wall Furnaces S-30
Fluorspar S-46
Food Mixers, Electric S-32
Forced Air Furnaces S-30
Foreign Trade S-44
Forgings, Steel ..... S- 9
Foundry Equipment, Sales S-27
Freezers, Electric S-32
Freight Carloadings S-44
Fuel S-47
Fuel Oil Consumption S-47
Furnaces:
Duct S-31
Floor and Wall S-30
Forced Air S-30
Gravity Air-Flow S-30
Induction S-28
Industrial S-28
Furniture, Metal Household S-31

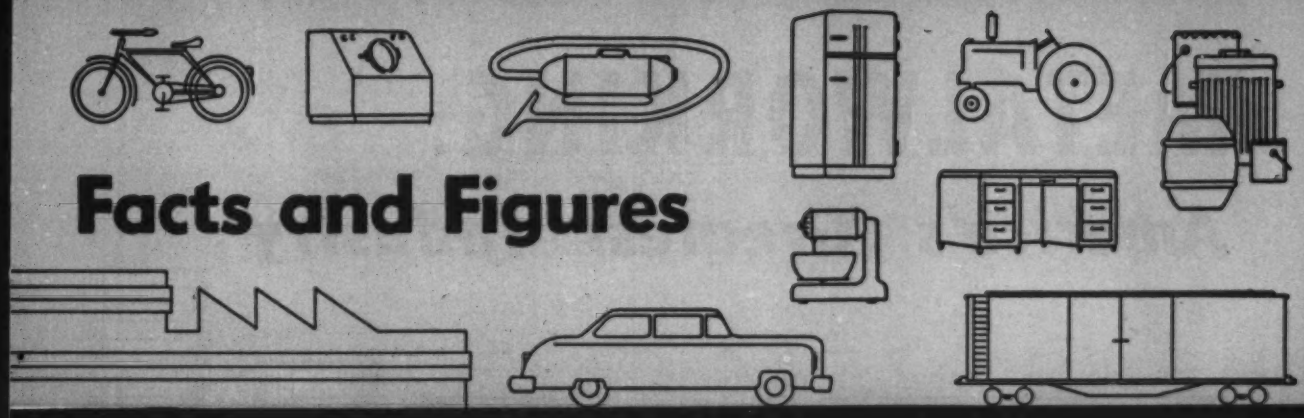
Gas, LP:
Consumption in Steel Industry . S-47
Gas, Natural:
Consumption in Steel Industry . S-47
Sales S-47
Gear Bookings, Shipments S-27
Generators S-27
Gravity Air-Flow Furnaces S-30
Gray Iron Castings S-12
Grills, Electric S-32
Gross National Product S-45

Heat Resisting Steel Production .. S- 9
Heat Treating S-27
Heaters:
Duct S-31
Electric, Portable S-32
Unit S-26, S-31
Water S-33
Hi-Fi Components S-34
High Alloy Castings S-13
High Speed Steel Shipments ..... S- 9
Hot Plates S-32
Hours Worked:
Agricultural Machinery and Tractors S-42
Aircraft and Parts S-42
Electrical Appliances S-42
Fabricated Structural Metal Products S-42
Iron and Steel Foundries S-42
Metalworking Industry S-40
Metalworking Machinery S-42
Motor Vehicles and Equipment . S-42
Primary Smelting and Refining of Nonferrous Metals S-42
Steel Industry S-41
Household Equipment S-30, S-31, S-32, S-33
Household Metal Furniture S-31
Houses Started S-48

Imports:
Automobiles S-35
Bearings S-29
General, U. S. S-44
Iron and Steel .....S-6, S- 7
Incinerators, Gas Fired S-31
Income, Corporate S-45
Income, National S-45
Incorporations, Business S-44
Induction Heating Equipment S-28
Industrial Fasteners S-29
Industrial Heating Equipment S-28
Industrial Production Index S-39
Industrial Supplies and Machinery S-27
Industrial Trucks S-26
Instruments, Sales ..... S- 4
Internal Combustion Engines S-29
Inventories, Manufacturing S-43
Iridium Prices S-19
Iron Ore Prices S-16
Iron Ore Statistics S-46
Iron and Steel:
Exports ..... S- 7
Imports .....S-6, S- 7
Prices S-17
World Production .....S-6, S- 7
Ironers, Standard Size S-32
Irons, Electric Flat S-32

Kitchen Cabinets, Steel S-32

Labor S-40, S-41, S-42
Labor Turnover S-42
Labor Union Membership S-42
Lamps (Electric Bulbs) S-31
Lead:
Consumption S-21
Diecastings S-14
Prices S-19
Production S-21



Facts and Figures

Liquefied Petroleum Gas
  Consumption S-47
Locomotives S-37

Machine Tools, New Orders:
  Forming Types S-25
  Metal Cutting Types S-24
Machine Tools, Producers' Total Shipments S-25
Machine Tools, Shipments:
  Forming Types S-25
  Metal Cutting Types S-24
Machine Tools, Used S-25
Machinery:
  Backlogs S-43
  Inventories S-43
  New Orders S-43
  Sales (Production) S-4, S-43
Machinery, Construction S-28
Machinery, Farm S-38
Machinery, Metalworking:
  Shipments S-25
  Wages, Hours S-42
Magnesium:
  Castings S-14
  Ingot Production S-23
  Prices S-19
  Wrought Products S-22
Malleable Iron Castings S-12
Manganese S-23
Manufacturers':
  Backlogs S-43
  Inventories S-43
  New Orders S-43
  Sales (Production) S-43
Manufacturing Production Index . S-39
Material Handling Equipment S-26
Mattresses and Bedsprings S-31
Metal Fabricating Production Index S-39
Metalworking, Comparison with Other Industries ..... S- 5
Metalworking Employment ..... S- 5
Metalworking Machinery:
  Shipments S-25
  Wages, Hours S-42
Metalworking, Number of Plants.. S- 5
Metalworking Sales .....S-4, S- 5
Metalworking, Value Added by Manufacture ..... S- 5
Molybdenum Concentrates S-23
Molybdenum Products S-23
Motors:
  Electric S-27
  Outboard S-29

Natural Gas:
  Consumption S-47
  Sales S-47
New Orders, Manufacturers' S-43
New Plant, Equip. Expenditures .. S-48
Nickel Prices S-19
Nickel Production S-23
Nonferrous Metals:
  Prices S-19
  Production ...S-20, S-21, S-22, S-23

Office Machines S-27
Oil Burners S-31
Ore:
  Chrome S-25
  Iron, Prices S-16
Ore (continued)
  Iron, Statistics S-46
Oxygen, Consumption S-47

Pails, Steel S-15
Pearlitic Malleable Castings S-12
Phonograph Sales S-34
Pig Iron:
  Capacity ..... S- 8
  Consumption, Stocks S-46
  Prices S-17
  Production ..... S- 8
  Stocks S-46
  World Production ..... S- 7
Plant, Equip. Expenditures S-48
Plants, Number of Metalworking . S- 5
Platinum Prices S-19
Plumbing Fixtures S-31
Power S-47
Price Composites:
  Finished Steel S-17
  Pig Iron, Basic S-17
  Pig Iron, Foundry S-17
  Pig Iron, Malleable S-17
  Scrap, Steelmaking S-17
Price Indexes:
  Consumer S-39
  Steel, BLS S-16
  Wholesale S-39
Prices:
  Coke, Oven Foundry S-16
  Coke, Beehive S-16
  Finished Steel S-16
  Iron Ore, Lake Superior S-16
Prices, Average Monthly:
  Chicago S-18
  Coal Chemicals S-18
  Eastern Pennsylvania S-18
  Pittsburgh S-18
Prices, Nonferrous:
  Aluminum S-19
  Antimony S-19
  Brass, Bronze S-19
  Cobalt S-19
  Copper S-19
  Iridium S-19
  Lead S-19
  Magnesium S-19
  Nickel S-19
  Platinum S-19
  Silver S-19
  Tin S-19
  Zinc S-19
Primary Metals:
  Backlogs S-43
  Inventory S-43
  New Orders S-43
  Production Index S-39
  Sales (Production) S-4, S-43
Pumps:
  Farm S-38
  Industrial S-26
Purchasing Power of Dollar S-45

Radiators, Cast Iron S-31
Radios S-34
Railroad Cars:
  Locomotives Put in Service ... S-37
  Orders, Freight, Passenger S-37
  Shipments—Freight, Passenger S-37
Ranges:
  Electric S-33
  Gas S-33
Raw Materials S-46, S-47
Receiving Tubes S-34
Rectifiers, Semiconductor S-34
Refractories S-46
Refrigeration Equipment S-26
Refrigerators, Electric S-33
Resistance Welding Equipment ... S-29
Revenues, U. S. Government S-45

Sales (Production):
  Manufacturers' S-43
  Metalworking Industry ....S-4, S- 5
Sandwich Grills S-32
Scrap:
  Autos and Trucks S-35
  Consumption by Industries S-46
  Exports, Imports S-46
  Iron and Steel S-46
  Prices S-17, S-18
Screw Machine Products S-27
Secondary Aluminum Production .. S-22
Shavers, Electric S-32
Shipbuilding S-36
Shipments of Steel Mill Products S-10, S-11
Silver Prices S-19
Silver Production S-23
Skillets, Electric S-32
Stainless Steel:
  Distribution S-10
  Production ..... S- 9
Stampings, Shipments S-29
Standard Malleable Castings S-12
Steel:
  Alloy Distribution S-10
  Alloy Production ..... S- 9
  Capacity ..... S- 8
  Carbon Distribution S-10
  Castings S-13
  Consumption for Metal Cans ... S-15
  Fabricated Structural S-48
  Finished, Distribution S-10
  Forgings ..... S- 9
  Ingots and Castings ..... S- 8
  Price Index, BLS S-16
  Prices S-16, S-17, S-18
  Production .....S-6, S- 8
  Shipments S-10, S-11
  Stainless, Distribution S-10
  Stainless, Production ..... S- 9
  Tool Steel ..... S- 9
  World, Production ..... S- 6
Stokers S-31
Stoves:
  Coal and Wood, Cooking S-32
  Domestic Heating S-30
  Oil, Cooking S-32
Structural Steel, Fabricated S-48

Taxes, Corporate S-45
Television:
  Picture Tubes S-34
  Sets S-34
Tin:
  Consumption S-23
  Prices S-19
  Production S-23
  Stocks S-23
  World S-23
Tin Plate Cans S-15
Titanium Production S-21
Toasters, Electric S-32
Tool Steel Shipments ..... S- 9
Tractors, Shipments S-28, S-38
Trailers, Truck S-35
Transistors S-34
Transit Equipment S-37
Transportation S-35, S-36, S-37
Transportation Equipment:
  Backlogs S-43
  Inventory S-43
  New Orders S-43
  Sales (Production) S-4, S-43
Trucks:
  Industrial S-26
  Production S-35
  Registrations S-37
Trucktrailers S-35
Tubes:
  Receiving S-34
  Television Picture S-34
Tungsten Concentrates S-23
Typewriters S-27

Unemployment S-41
Unit Heaters S-26, S-31
U. S. Government:
  Debt S-45
  Expenditures S-45
  Revenues S-45
Uranium Concentrate S-23
Used Machine Tools S-25

Vacuum Cleaners S-32
Value Added by Manufacture .... S- 5

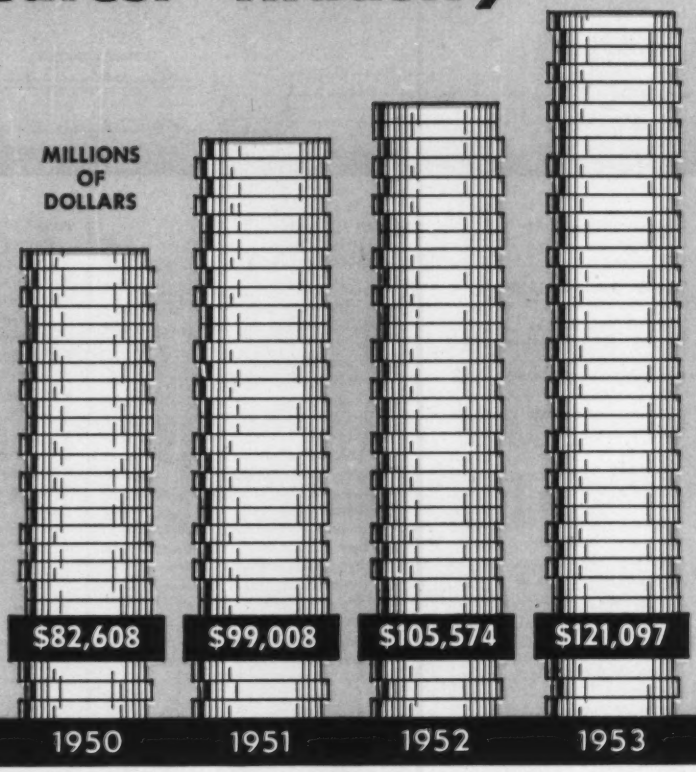
Waffle Irons, Electric S-32
Wages:
  Agricultural Machinery and Tractors S-42
  Aircraft and Parts S-42
  Electrical Appliances S-42
  Fabricated Structural Metal Products S-42
  Iron and Steel Foundries S-42
  Metalworking S-40
  Metalworking Machinery S-42
  Motor Vehicles and Equipment . S-42
  Primary Smelting and Refining of Nonferrous Metals S-42
  Steel Industry S-40, S-41
Wall, Floor Furnaces S-30
Washer-Dryers S-32
Washers, Air S-26
Washers, Clothes S-33
Water Heaters S-33
Water Systems, Domestic S-38
Welding Electrodes S-29
Welding Equipment S-29
Wholesale Price Indexes S-39
Windmills S-38
Work Stoppages S-40

Zinc:
  Castings S-14
  Consumption S-21
  Mine Production S-21
  Prices S-19

METALWORKING:

America's Greatest Industry

Manufacturers' sales in the metalworking industry climbed to a record $148.9 billion in 1960 despite the recession that set in early in the year. The 1960 figure is 2.6 per cent above the previous record $145,036,000,000 attained in 1959. Sales were at an average annual rate of $156,310,000,000 in the first half of 1960, and at an annual average rate of $141,490,000,000 in the second half.

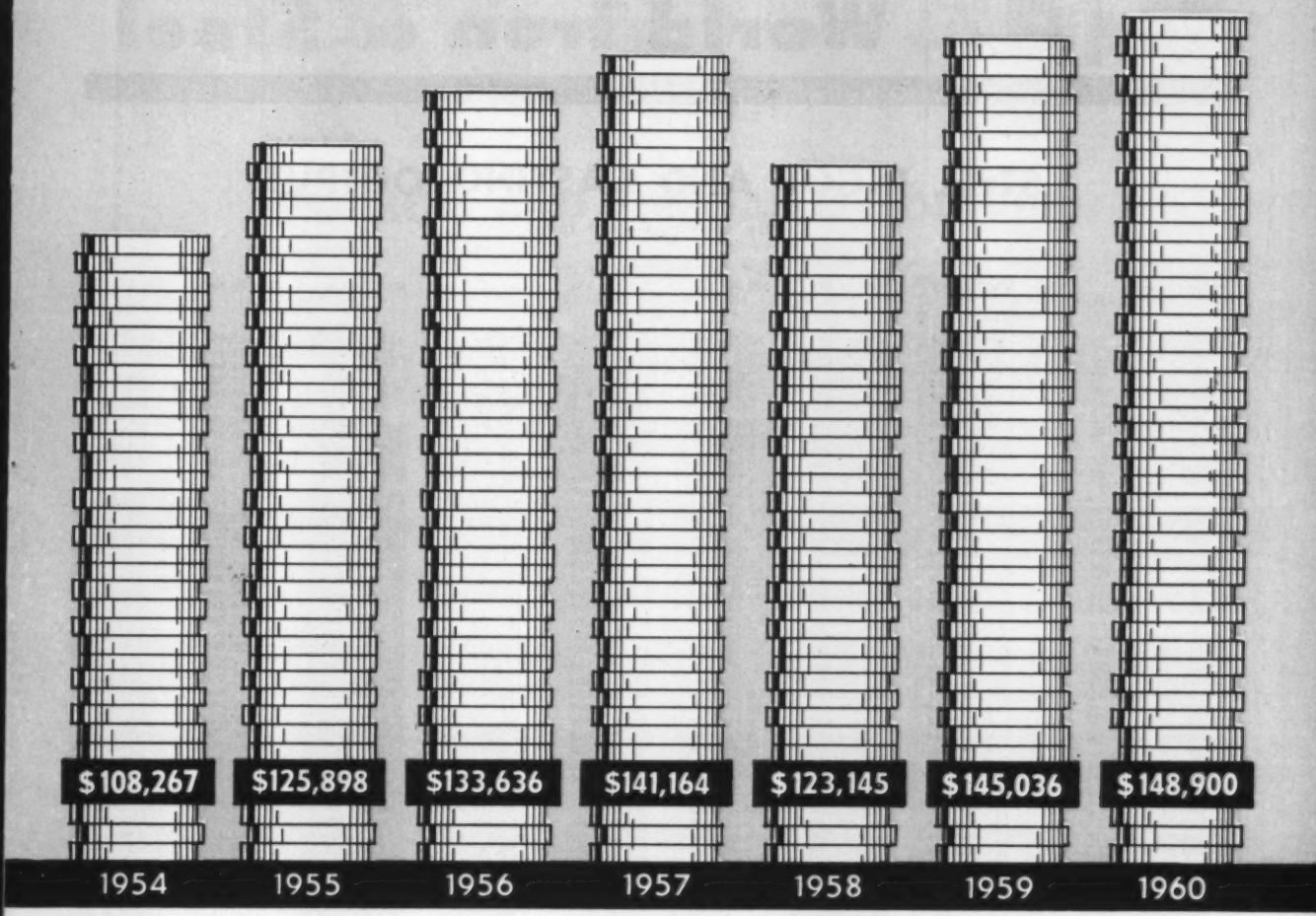


MANUFACTURERS' SALES IN METALWORKING INDUSTRY

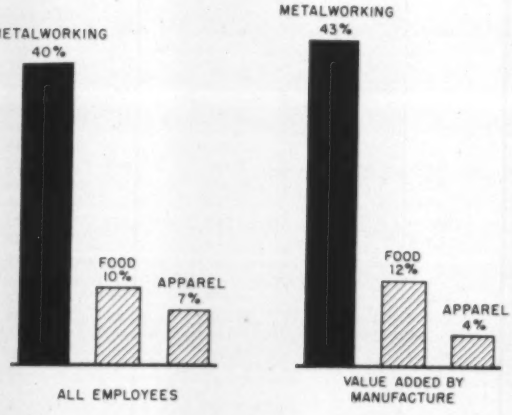
(Millions of dollars—not adjusted for seasonal variation)

Standard Industrial Classifications	Primary Metals	Fabricated Metal Products	Machinery	Transportation Equipment	Instruments	TOTALS Metalworking Industry
1960	$25,790	$20,060	$56,650	$41,390	$5,010	$148,900
1959	26,568	20,124	54,142	39,502	4,700	145,036
1958	22,949	17,277	45,979	32,649	4,281	123,145
1957	27,852	18,442	50,920	40,000	3,950	141,164
1956	28,339	17,683	47,856	36,037	3,721	133,636
1955	26,468	16,275	41,392	38,402	3,361	125,898
1954	20,106	14,712	38,497	31,615	3,337	108,267
1953	23,841	15,203	41,634	37,028	3,391	121,097
1952	20,725	13,625	38,402	29,582	3,240	105,574
1951	23,087	13,655	33,989	25,606	2,671	99,008
1950	19,046	11,710	27,114	22,651	2,087	82,608

Figures (except instruments) are from Office of Business Economics. Instrument figures through 1958 are from the Census of Manufactures. The 1959 and 1960 instruments figures are estimated by STEEL.



HOW METALWORKING TOWERS OVER OTHER MANUFACTURING INDUSTRIES



Standard Industrial Classifications	TOTAL NUMBER PLANTS	NUMBER OF EMPLOYEES (000)	VALUE Added by Manufacture (000,000)
20. Food and Kindred Products	40,001	1,667	$17,031
21. Tobacco Manufactures	506	84	1,415
22. Textile Mill Products	7,786	919	5,019
23. Apparel and Related Products ..	29,338	1,168	5,962
24. Lumber and Wood Products	37,522	582	3,142
25. Furniture and Fixtures	10,563	358	2,428
26. Pulp, Paper, and Products	5,312	556	5,699
27. Printing and Publishing	35,350	861	7,875
28. Chemicals and Allied Products..	12,410	730	12,619
29. Petroleum and Coal Products ..	1,632	179	2,512
30. Rubber Products	1,325	232	2,352
31. Leather and Leather Goods	4,421	342	1,849
32. Stone, Clay, and Glass Products	15,226	552	5,500
33. Primary Metal Products	**6,223**	**1,073**	**11,434**
34. Fabricated Metal Products	**24,860**	**1,038**	**9,110**
35. Machinery (except Electrical) ..	**31,180**	**1,549**	**14,328**
36. Electrical Machinery	**7,066**	**1,005**	**9,114**
37. Transportation Equipment	**6,331**	**1,480**	**14,463**
38. Instruments & Related Products..	**3,403**	**291**	**2,881**
Total Metalworking Industry	**79,063**	**6,436**	**$61,329**
39. Miscellaneous Manufactures (including Ordnance)	17,622	725	6,483
Administrative and Auxiliary	n.a.	557	....

n.a.—not available.
1958 Census of Manufactures.

World Iron & Steel

METALWORKING FACTS AND FIGURES

STEEL INGOT AND CASTING OUTPUT

(By countries—net tons)

	1960	1959	1958	1957	1956	1955	1954	1953
World Totals	376,792,017	334,612,287	297,787,501	321,150,436	311,412,468	296,670,799	245,799,834	258,121,823
U. S.	99,281,601	93,446,132	85,254,885	112,714,996	115,216,149	117,036,085	88,311,652	111,609,719
Great Britain	27,221,300	22,609,300	21,912,600	24,302,400	23,137,280	22,165,470	20,742,400	19,721,520
Japan	23,883,500	13,331,200	13,357,700	13,855,900	12,242,145	10,348,470	8,524,990	8,428,420
Canada	5,686,416	5,847,855	4,329,116	5,005,846	5,266,039	4,499,695	3,157,867	4,103,914
Australia	4,092,800	3,711,400	3,478,900	3,107,400	2,598,129	2,916,480	2,486,400	2,294,880
Sweden	3,548,300	3,130,500	2,679,700	2,766,800	2,673,080	2,338,600	2,048,200	1,960,200
Austria	3,502,000	2,769,000	2,637,800	2,765,700	2,290,580	2,005,300	1,818,300	1,411,520
India	3,420,400	2,718,300	2,630,400	1,920,200	1,946,660	1,908,704	1,886,975	1,687,280
South Africa	2,506,600	2,088,900	2,019,400	1,914,700	1,789,190	1,632,960	1,517,710	1,367,855
Brazil	2,000,000	1,876,000	1,760,000	1,431,900	1,515,660	1,282,600	1,263,130	1,117,930
Spain	2,137,900	1,995,300	1,735,000	1,483,700	1,370,160	1,334,300	1,210,000	983,730
Yugoslavia	1,592,700	1,432,000	1,233,500	1,156,300	977,740	886,600	677,600	566,500
Mexico	1,027,100	1,119,700	1,089,100	757,300	651,460	560,730	499,840	508,310
Norway	527,900	458,000	403,400	385,800	320,770	188,490	133,380	122,360
Chile	436,700	456,800	383,600	427,700	419,980	319,670	353,840	345,020
Denmark	329,100	319,300	281,100	288,800	264,550	261,250	219,360	198,410
Switzerland	250,000	250,000	269,000	257,900	188,500	183,000	165,350	.....
Argentina	312,500	236,400	268,900	243,600	231,480	240,300	205,030	191,800
Finland	280,400	260,000	207,200	224,900	213,850	195,110	192,900	162,000
Turkey	284,800	235,600	176,400	194,000	212,740	207,230	184,290	179,670
Taiwan	75,000	70,000	117,900	98,100	69,445	44,090	27,560	22,050
Colombia	125,000	120,000	129,000	129,000	99,000	85,000	.....	.....
Southern Rhodesia	70,000	70,000	70,000	73,900	58,420	49,600	36,380	27,560
South Korea	20,000	20,000	22,000	18,700	11,020	12,130	1,100	1,100
Pakistan	17,000	17,000	11,000	13,200	12,125	12,125	11,000	12,125
West Germany	37,730,600	28,465,800	25,115,900	27,014,100	25,561,235	23,469,600	19,177,400	16,962,000
France	18,964,900	16,773,700	16,101,300	15,538,000	14,768,615	13,851,200	11,489,700	10,996,700
Italy	9,051,000	7,452,600	6,912,500	7,481,300	6,512,390	5,934,500	4,627,700	3,850,000
Belgium	8,144,900	7,152,800	6,625,900	6,918,000	7,034,880	6,481,200	5,485,700	4,986,300
Saar	4,000,000	3,969,300	3,836,000	3,820,600	3,719,160	3,481,500	3,085,500	2,952,400
Luxembourg	4,501,800	4,039,900	3,724,700	3,850,300	3,809,550	3,547,800	3,110,800	2,924,900
The Netherlands	2,128,200	1,840,400	1,585,100	1,306,200	1,157,415	1,070,520	1,020,360	945,450
Free World Totals	267,169,517	233,277,187	209,759,001	241,467,236	236,319,388	228,550,059	183,374,414	200,641,623
USSR	72,090,400	65,807,300	60,484,300	56,411,300	53,679,800	49,798,100	45,577,400	41,800,000
China	15,000,000	14,693,000	8,818,400	5,897,300	4,921,770	3,058,000	2,452,800	1,945,900
Poland	7,299,400	6,786,900	6,242,300	5,846,600	5,526,930	4,869,040	4,344,120	3,964,400
Czechoslovakia	7,362,300	6,763,700	6,073,700	5,694,500	5,381,430	4,921,400	4,499,200	4,873,000
East Germany	3,602,300	3,534,000	3,354,300	3,190,100	3,020,300	2,758,800	2,454,100	2,394,700
Hungary	2,078,900	1,936,700	1,793,400	1,515,700	1,560,860	1,791,900	1,640,100	1,697,300
Rumania	1,939,200	1,563,500	1,029,500	952,400	858,690	841,500	689,700	790,900
Bulgaria	250,000	250,000	232,600	175,300	143,300	82,000	68,000	14,000
Iron Curtain Totals	109,622,500	101,335,100	88,028,500	79,683,200	75,093,080	68,120,740	61,925,420	57,480,200

U. S. Steel Imports by Country of Origin

(1960—net tons)

	Belgium, Luxembourg	Japan	West Germany	France	United Kingdom	The Netherlands	Italy	Other (including Canada)
Ingots, Blooms, Slabs, and Billets	7,608	935	12,707	232	1,797	.....	2	44,591
Wire Rods	21,852	163,788	90,608	47,149	31,632	1,156	17,560	34,471
Concrete Reinforcement Bars	231,804	96,437	61,581	65,719	280	.....	1,342	58,378
Carbon and Alloy Bars	192,218	20,674	26,902	42,261	10,447	1,584	588	28,419
Hollow Bars and Drill Steel	.....	2	142	.....	69	.....	.....	1,635
Skelp	91	473	11	.....	.....	.....	.....	146
Plates	31,585	46,694	85,464	6,528	3,284	4,469	596	32,152
Sheets and Strip	44,407	55,114	91,667	25,760	2,778	34,183	16,157	110,149
Tin Plate and Terne Plate	500	5,074	4,054	6,046	13,977	10	.....	9,603
Structural Shapes	206,373	5,597	12,545	53,680	21,419	461	3,127	8,471
Sheet Piling	5,649	.....	1,390	1,180	.....	.....	.....	123
Rails and Accessories	1,274	.....	4,266	40	1	.....	.....	3,126
Wheels and Axles	19	.....	.....	.....	552	.....	.....	1,120
Pipe and Tubing	29,929	63,014	136,350	61,335	95,181	9,460	10,209	74,613
Wire and Wire Products	225,534	143,573	60,178	36,560	29,811	33,258	23,812	42,730
Totals	998,843	601,375	587,865	346,490	211,228	84,581	73,393	449,727

American Iron & Steel Institute.

PIG IRON AND FERROALLOY OUTPUT

(Includes ferroalloys made in electric furnaces, where available)

(By countries—net tons)

	1960	1959	1958	1957	1956	1955	1954	1953
World Totals	266,931,834	234,705,635	216,273,447	233,308,166	221,280,822	211,496,562	174,505,389	184,982,794
U. S.	67,320,129	62,123,786	58,808,294	80,798,285	77,575,458	79,263,865	59,806,242	77,250,168
Great Britain	17,656,600	14,091,800	14,531,600	15,996,600	14,750,512	13,966,400	13,309,408	12,515,775
Japan	13,248,500	10,849,900	8,477,800	7,863,800	6,904,800	5,785,280	5,069,130	4,969,910
Canada	4,279,205	4,163,049	3,170,333	3,948,381	3,815,052	3,333,967	2,317,839	3,206,471
India	4,439,000	3,441,400	2,364,400	2,140,700	2,192,500	2,122,176	2,197,440	1,989,455
Australia	3,191,200	2,804,300	2,558,400	2,350,100	2,140,700	2,016,000	2,083,200	1,894,705
South Africa	2,199,100	1,993,000	1,743,800	1,564,200	1,495,800	1,433,824	1,319,360	1,347,360
Austria	2,484,600	2,030,400	2,006,200	2,162,700	1,915,800	1,658,470	1,489,290	1,456,180
Spain	2,105,300	1,868,600	1,479,300	1,101,200	1,040,600	1,094,500	998,580	910,470
Sweden	1,660,500	1,548,000	1,558,700	1,700,800	1,555,300	1,371,370	1,101,320	1,163,140
Brazil	1,400,000	1,378,000	1,543,220	1,399,900	1,289,700	1,181,400	1,197,790	974,600
Yugoslavia	1,134,900	995,900	859,800	812,400	713,200	565,400	405,650	309,750
Norway	792,300	672,600	560,000	623,900	498,200	392,420	271,170	305,340
Mexico	523,800	521,200	526,900	456,400	450,800	343,920	261,250	266,760
Chile	308,400	320,500	335,100	421,100	405,600	282,190	336,200	315,260
Turkey	265,100	281,200	254,600	240,300	238,100	221,160	216,050	238,080
Colombia	170,000	165,000	164,200	156,500	.....	.....	.....	.....
Finland	114,500	106,000	111,300	141,100	113,500	125,660	81,570	87,080
Southern Rhodesia	80,000	83,000	70,000	77,200	66,100	22,050	15,430	39,680
Denmark	76,100	63,900	48,500	65,000	61,700	60,630	44,090	39,700
Switzerland	58,000	49,000	44,100	49,600	.....	.....	.....	.....
Argentina	35,000	33,000	32,000	37,500	31,300	38,580	43,650	40,010
Taiwan	20,000	19,800	18,700	22,000	19,800	15,400	15,400	7,700
South Korea	9,000	9,000	8,800	6,600	4,400	4,400	2,200	.....
West Germany	25,563,900	20,409,100	18,469,000	20,359,500	19,501,900	18,230,300	13,839,100	12,883,200
France	15,732,000	13,946,300	13,384,100	13,310,300	12,830,800	12,196,800	9,835,100	9,634,900
Belgium	7,361,200	6,575,200	6,083,600	6,159,700	6,350,300	5,929,000	5,087,500	4,639,800
Luxembourg	4,173,300	3,795,200	3,621,100	3,712,500	3,655,200	3,393,500	3,061,100	2,990,900
Saar	3,600,000	3,537,300	3,420,400	3,492,100	3,341,100	3,166,900	2,746,700	2,620,200
Italy	3,051,200	2,415,100	2,388,700	2,430,600	2,198,000	1,907,400	1,480,600	1,475,100
The Netherlands	1,471,100	1,256,200	1,006,400	772,700	729,700	737,440	671,550	650,100
Free World Totals	187,515,934	161,526,735	149,649,347	174,373,666	165,885,922	160,860,402	129,323,909	144,221,794
USSR	51,587,600	47,288,700	43,651,100	40,829,200	39,411,600	38,641,000	32,970,000	30,250,000
China	13,000,000	12,000,000	10,471,800	6,547,700	5,265,700	4,048,000	3,385,800	2,443,100
Poland	5,019,900	4,823,700	4,259,300	4,058,700	3,884,700	3,423,310	2,929,080	2,528,900
Czechoslovakia	5,112,500	4,879,300	4,160,100	3,927,500	3,617,700	3,280,200	3,062,400	3,069,000
East Germany	2,164,900	2,093,300	1,956,600	1,833,100	1,735,000	1,668,700	1,450,000	1,174,800
Hungary	1,300,000	1,235,900	1,212,500	922,600	846,600	940,500	902,000	787,600
Rumania	1,106,000	933,000	812,400	756,200	642,600	626,450	475,200	501,600
Bulgaria	125,000	125,000	100,300	59,500	11,000	8,000	7,000	6,000
Iron Curtain Totals	79,415,900	73,178,900	66,624,100	58,934,500	55,394,900	50,636,160	45,181,480	40,761,000

U. S. Exports of Iron and Steel Products

(Net tons)

Products	1960	1959	1958	1957	1956	1955
Semifinished Steel	130,949	34,650	124,326	721,166	528,758	721,116
Shapes and Plates	386,312	305,658	554,236	1,075,072	671,559	505,009
Rails and Accessories	133,808	81,524	164,921	235,166	87,103	67,769
Bars and Tool Steel	85,246	67,592	123,098	214,631	298,052	205,801
Pipe and Tubing	195,197	266,342	623,044	1,185,102	782,966	350,155
Wire and Wire Products	28,919	25,700	35,055	39,437	56,242	49,337
Tin Mill Products	685,753	459,853	494,800	802,471	847,871	967,594
Sheets and Strip	1,333,354	435,333	703,430	1,074,633	1,075,352	1,194,217
Totals	2,979,538	1,676,652	2,822,910	5,347,678	4,347,903	4,060,998

American Iron & Steel Institute.

U. S. Imports of Iron and Steel Products

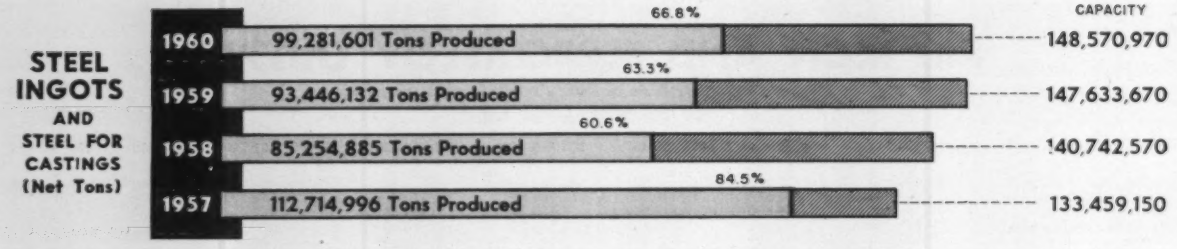
(Net tons)

Products	1960	1959	1958	1957	1956	1955
Semifinished Steel	476,809	539,674	199,414	62,432	92,230	193,864
Shapes and Plates	530,787	798,145	171,033	290,641	398,419	111,767
Rails and Accessories	10,398	9,586	4,933	5,417	8,385	7,388
Bars and Tool Steel	840,482	1,339,081	649,243	263,063	399,282	288,720
Pipe and Tubing	480,091	553,139	200,046	190,836	140,365	77,107
Wire and Wire Products	595,456	754,542	454,488	314,509	259,743	252,476
Tin Mill Products	39,264	67,111	182	123	1,145	47
Sheets and Strip	380,215	332,441	26,969	27,195	36,516	39,288
Totals	3,353,502	4,393,719	1,706,308	1,154,216	1,336,085	970,657

American Iron & Steel Institute.

Production-Capacity

METALWORKING FACTS AND FIGURES



ANNUAL STEEL CAPACITY & PRODUCTION BY PROCESSES

	Open Hearth		Bessemer		Crucible	Electric		Oxygen Process		TOTALS		%
	Capacity	Production	Capacity	Production	Capacity‡	Capacity	Production	Capacity	Production	Capacity†	Production	Capability
1960	126,621,630	86,367,506	3,396,000	1,189,196	40	14,395,900	8,378,743	4,157,400	3,346,156	148,570,970	99,281,601	66.8
1959	126,528,380	81,668,997	3,577,000	1,380,283	40	13,495,090	8,532,514	4,033,160	1,864,338	147,633,670	93,446,132	63.3
1958	122,321,830	75,879,394	4,027,000	1,395,985	40	13,312,700	7,979,506	1,081,000	‡	140,742,570	85,254,885	60.6
1957	116,912,410	101,657,776	4,505,000	2,475,138	40	11,501,700	8,582,082	540,000	‡	133,459,150	112,714,996	84.5
1956	112,317,040	102,540,585	4,787,000	3,227,997	40	10,719,010	9,147,567	540,000	‡	128,363,090	115,216,149	89.8
1955	110,234,160	105,359,417	4,787,000	3,319,517	40	10,807,110	8,357,151	.....	.....	125,828,310	117,036,085	93.0
1951	109,094,730	80,327,494	4,787,000	2,548,104	40	10,448,640	5,436,054	.....	.....	124,330,410	88,311,652	71.0
1953	102,677,980	100,473,823	4,637,000	3,855,705	40	10,232,450	7,280,191	.....	.....	117,547,470	111,609,719	94.9
1952	94,973,780	82,846,439	5,381,000	3,523,677	40	8,232,850	6,797,923	.....	.....	108,587,670	93,168,039	85.8
1951	91,034,020	93,166,518	5,621,000	4,890,946	20	7,554,610	7,142,384	.....	.....	104,229,650	105,199,848	100.9
1950	86,984,490	86,262,509	5,537,000	4,534,558	20	6,871,290	6,039,008	.....	.....	99,392,800	96,836,075	96.9#
1949	84,817,040	70,248,803	5,191,000	3,946,656	20	6,112,870	3,782,717	.....	.....	96,120,930	77,978,176	81.1
1948	83,610,690	79,340,157	5,226,000	4,243,172	20	5,396,750	5,057,141	.....	.....	94,233,460	88,640,470	94.1
1947	81,010,990	76,873,793	5,151,000	4,232,543	20	5,076,240	3,787,735	.....	.....	91,241,250	84,894,071	93.0
1946	81,236,250	60,711,963	5,154,000	3,327,737	20	5,500,290	2,563,024	.....	.....	91,890,560	66,602,724	72.5
1945	84,171,590	71,939,602	5,874,000	4,305,318	3,800	5,455,890	3,456,728	.....	.....	95,505,280	79,701,648	83.5
1944	82,223,610	80,363,953	6,074,000	5,039,923	3,800	5,350,880	4,237,724	.....	.....	93,652,290	89,611,600	95.5#
1943	79,180,880	78,621,804	6,553,000	5,625,492	3,800	4,554,980	4,589,216	.....	.....	90,292,660	88,836,512	98.1#
1942	78,107,260	76,501,957	6,721,400	5,573,424	3,800	3,737,510	3,976,550	.....	.....	88,569,970	86,031,931	96.8#
1941	74,565,510	74,359,619	6,996,520	5,578,071	3,942	2,586,320	2,871,569	.....	.....	84,152,292	82,839,259	97.3#
1940	73,721,592	61,573,083	6,009,920	3,708,573	5,354	1,882,630	1,701,030	.....	.....	81,619,496	66,982,686	82.1

American Iron & Steel Institute.
†As of Jan. 1. ‡Production included with electric steel. #Based on average annual capacity.

MONTHLY OUTPUT OF STEEL INGOTS & CASTINGS

	Open Hearth		Bessemer		Oxygen Process		Electric		Totals	
	Net Tons	% Capac.	Net Tons	% Capac.	Net Tons	% Capac.	Net Tons	% Capac.	Net Tons	% Capac.
1960	86,367,506	68.2	1,189,196	35.0	3,346,156	80.5	8,378,743	58.2	99,281,601	66.8
Jan.	10,510,616	97.7	211,132	73.2	280,981	79.6	1,046,675	85.6	12,049,404	95.5
Feb.	9,715,527	96.6	216,263	80.2	245,458	74.3	949,558	83.0	11,126,806	94.3
Mar.	10,103,122	93.9	202,812	70.3	306,741	86.9	952,008	77.9	11,564,683	91.6
Apr.	8,603,306	82.7	105,336	37.7	302,763	88.6	766,452	64.8	9,777,857	80.1
May	7,844,140	72.9	73,010	25.3	309,505	87.7	603,817	49.4	8,830,472	70.0
June	6,441,594	61.9	80,344	28.8	314,766	92.1	568,169	48.0	7,404,873	60.6
July	5,494,331	51.1	61,700	21.4	289,003	81.8	505,890	41.4	6,350,924	50.3
Aug.	5,860,394	54.5	52,652	18.3	279,550	79.2	645,404	52.8	6,838,000	54.2
Sept.	5,525,244	53.1	42,228	15.1	287,323	84.1	603,626	51.0	6,458,421	52.9
Oct.	5,917,780	55.0	56,914	19.7	270,450	76.6	623,236	51.0	6,868,380	54.4
Nov.	5,308,894	51.0	51,246	18.4	257,286	75.3	554,514	46.9	6,171,940	50.5
Dec.	5,042,558	46.9	35,559	12.3	202,330	57.3	559,394	45.8	5,839,841	46.3
1959	81,668,997	64.5	1,380,283	38.6	1,864,338	46.2	8,532,514	63.2	93,446,132	63.3
Jan.	8,280,985	77.1	120,005	39.5	186,820	54.5	729,575	63.7	9,317,385	74.3
Feb.	8,541,031	88.0	128,515	46.8	176,970	57.2	756,422	73.1	9,602,938	84.8
Mar.	10,216,474	95.1	184,892	60.9	236,595	69.1	929,784	81.1	11,567,745	92.3
Apr.	9,884,322	95.0	195,730	66.6	237,018	71.5	964,850	87.0	11,281,920	93.0
May	10,117,968	94.2	200,887	66.1	257,325	75.1	1,024,401	89.4	11,600,581	92.5
June	9,521,053	91.6	185,794	63.2	259,731	78.4	941,056	84.8	10,907,634	89.9
July	4,541,741	42.3	66,433	21.9	98,634	28.8	525,368	45.8	5,232,176	41.7
Aug.	1,171,342	10.9	none	...	none	...	267,935	23.4	1,439,277	11.5
Sept.	1,249,398	12.0	none	...	none	...	285,619	25.8	1,535,017	12.7
Oct.	1,385,490	12.9	none	...	none	...	319,043	27.8	1,704,533	13.6
Nov.	6,290,659	60.5	92,361	31.4	129,794	39.2	754,793	68.0	7,267,607	59.9
Dec.	10,468,534	97.4	205,666	67.7	281,451	82.2	1,033,668	90.2	11,989,319	95.6

†Includes crucible steels.
American Iron & Steel Institute.

PIG IRON †

CAPACITY & PRODUCTION

(Net tons)

	Capacity	Production	%
1960	96,520,630	67,320,129‡	69.7
January		7,830,097	95.5
February		7,414,002	96.7
March		7,793,411	95.1
April		6,830,093	86.1
May		6,294,411	78.0
June		5,309,497	66.9
July		4,523,497	55.2
August		4,497,106	54.9
September		4,125,379	52.0
October		4,510,819	55.0
November		4,174,865	52.6
December		3,876,776	47.3
1959	94,634,850	60,774,738	64.2
1958	91,000,110	57,764,100	63.5
1957	86,817,950	79,338,902	91.4
1956	85,485,230	75,960,560	88.9
1955	83,971,100	77,789,884	92.6
1954	82,001,390	58,646,884	71.6
1953	79,380,240	75,856,972	95.6
1952	73,782,340	62,150,928	84.2
1951	72,471,780	71,227,750	98.3
1950	71,580,110	65,439,769	91.4
1949	70,541,850	54,175,534	76.8
1948	67,438,930	61,043,806	90.5
1947	65,709,200	59,314,348	90.3
1946	67,340,590	45,547,907	67.6

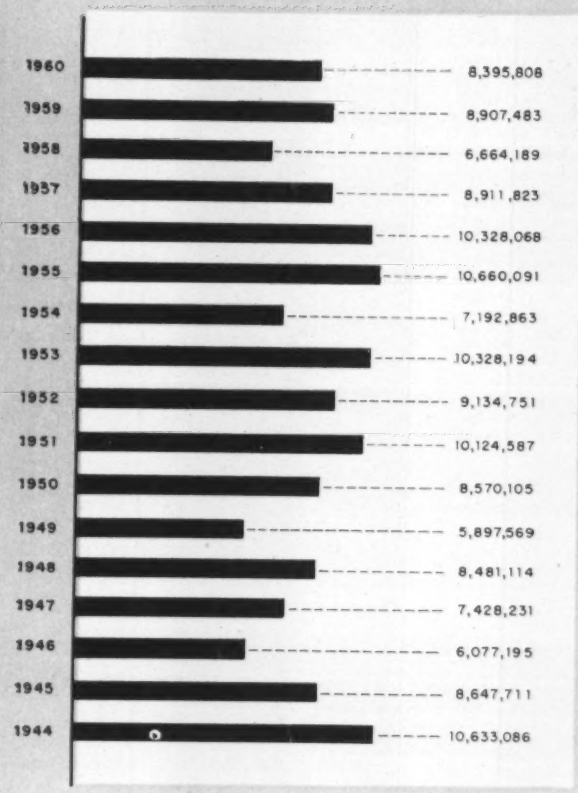
†Including ferroalloys made in blast furnaces. ‡Total does not equal sum of the months because of unreported revisions.
American Iron & Steel Institute.

Ferrous Production

METALWORKING FACTS AND FIGURES

ALLOY STEEL PRODUCTION

(Total ingots and castings—net tons)



ALLOY STEEL PRODUCTION BY PROCESSES

(Including stainless steel)
(Ingots and castings—net tons)

	Open Hearth			Basic Oxygen	Electric
	Basic	Acid	Totals		
1960	.....	.....	5,208,232	1,560	3,199,016
1959	5,144,438	88,856	5,233,294	....	3,674,189
1958	3,926,041	85,111	4,011,152	....	2,653,037
1957	5,745,682	169,893	5,915,580	....	2,996,243
1956	6,288,648	201,377	6,490,025	....	3,838,043
1955	6,735,450	185,473	6,920,923	....	3,739,168
1954	4,528,336	130,559	4,658,895	....	2,533,968
1953	6,599,038	185,341	6,784,379	....	3,543,815
1952	5,807,191	218,867	6,026,058	....	3,108,693
1951	6,585,635	238,034	6,823,669	....	3,300,918
1950	5,738,067	123,253	5,861,320	....	2,708,785
1949	4,192,344	105,550	4,297,894	....	1,599,675
1948	6,285,054	128,915	6,413,969	....	2,067,145
1947	5,520,540	128,754	5,649,294	....	1,778,937
1946	4,325,657	115,711	4,441,368	....	1,635,827
1945	5,572,353	274,889	5,847,242	....	2,800,469
1944	6,494,627	515,662	7,010,289	....	3,622,797

American Iron & Steel Institute.

Stainless & Heat Resisting Steel Production

(Net tons of Ingots)

Type Number	1960	1959
201	14,966	15,356
202	8,269	12,814
301	51,356	58,382
302	104,629	.....
302B		
302	.....	146,654
302B	.....	474
303	21,562	38,876
303Se	1,037	1,844
304	223,095	228,998
304L	24,421	23,230
305	4,599	7,314
309	2,791	4,015
309	4,744	6,016
309S	1,819	1,885
310	4,826	6,172
310S	1,446	1,272
314	.....	354
316	45,297	48,054
316L	17,629	14,778
317	805	1,053
321	18,099	32,341
347	9,710	.....
348		
347	.....	11,204
348	.....	997

Type Number	1960	1959
403	9,454	12,514
405	2,727	2,430
406	1,609	1,899
410	32,603	.....
414		
410	.....	38,850
414	.....	213
416	17,431	.....
416Se		
416	.....	31,510
416Se	.....	158
420	4,078	5,067
430	212,111	268,393
430F	2,372	3,512
430Se		
431	1,865	3,127
440A	2,107	.....
440B		
440C	2,033	.....
440A	.....	1,379
440B	.....	5,781
440C		
442	695	.....
443		
442	.....	1,016
443	.....	454
446	1,385	2,694
All other	149,193	87,978
Totals	1,000,763	1,128,518

American Iron & Steel Institute.

Tool Steels

(Excluding hollow drill steel)
(Shipments—net tons)

	1960	1959
HIGH SPEED TOOL STEELS		
Molybdenum Types	14,570	17,930
Tungsten Types	1,910	2,331
Totals	16,480	20,261
HOT-WORK TOOL STEELS		
Chromium Types	8,978	11,370
Tungsten Types	660	893
Miscellaneous Types	1,417	1,208
Totals	11,055	13,471
CHROMIUM DIE TOOL STEELS		
High Chromium Types	6,195	7,118
Medium Chromium Types	4,163	4,838
Low Chromium Types	1,216	977
Totals	11,574	12,933
OIL HARDENING TOOL STEELS		
All Types	15,643	15,883
SHOCK RESISTANCE TOOL STEELS		
All Types	5,892	6,081
SPECIAL PURPOSE ALLOY TOOL STEELS		
All Types	13,355	12,654
WATER HARDENING TOOL STEELS		
All Types	17,806	19,593
Grand Totals	91,805	100,876

American Iron & Steel Institute.

Steel Forgings

(Shipments for sale—net tons)

	Drop and Upset	Press and Open Hammer	Totals
1960	951,099	317,293	1,268,392
Jan.	93,577	28,974	122,551
Feb.	100,115	29,684	129,799
Mar.	107,753	30,153	137,906
Apr.	89,703	27,014	116,717
May	85,097	25,176	110,273
June	81,996	28,055	110,051
July	57,988	21,392	79,258
Aug.	62,965	25,353	88,318
Sept.	69,826	25,221	94,047
Oct.	72,860	24,588	97,448
Nov.	66,587	26,037	92,624
Dec.	63,754	25,646	89,400
1959	1,064,497	309,304	1,373,801
Jan.	90,662	22,264	112,926
Feb.	91,469	21,189	112,658
Mar.	101,084	24,732	125,816
Apr.	105,695	29,998	135,693
May	101,579	37,230	141,809
June	108,120	31,902	140,022
July	79,517	22,004	101,521
Aug.	77,484	20,416	97,900
Sept.	79,961	23,526	103,487
Oct.	74,323	22,979	97,302
Nov.	63,300	23,953	87,253
Dec.	85,313	29,111	114,424
1958	823,971	255,576	1,079,547
1957	1,120,428	376,147	1,496,575
1956	1,256,125	414,182	1,670,307
1955	1,316,540	434,093	1,750,633

U. S. Bureau of the Census.

Distribution

METALWORKING FACTS AND FIGURES

FINISHED STEEL DISTRIBUTION

By Market Classifications

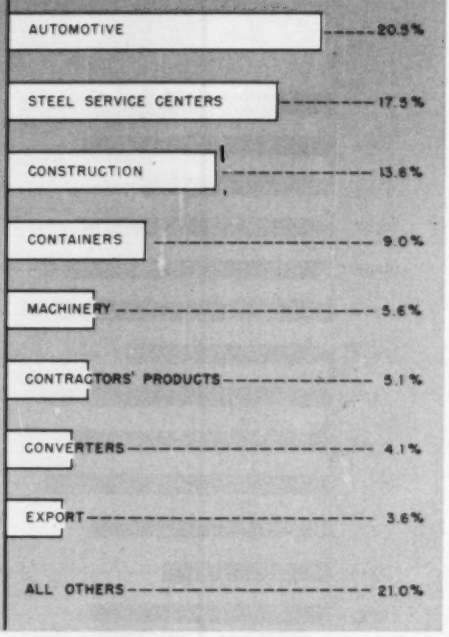
(All grades, net tons)

	1960	1959	1958	1957
Automotive	14,610,424	14,213,875	10,125,034	14,227,006
Steel Service Centers	12,479,830	13,048,754	10,902,283	14,507,303
Construction, including Maintenance	9,663,487	8,514,178	8,722,549	12,523,285
Containers	6,428,986	6,318,229	6,568,583	6,237,583
Machinery, Indus. Equip. & Tools	3,957,935	4,158,328	3,181,196	4,512,298
Contractors' Products	3,602,044	3,573,196	3,467,189	3,403,580
Converters & Processors	2,928,226	3,133,407	2,854,574	3,396,529
Export	2,562,818	1,408,477	2,429,149	4,568,795
Rail Transportation	2,525,267	2,356,840	1,472,112	4,149,074
Unclassified	2,120,373	2,029,068	691,571	820,119
Electrical Machinery & Equipment	2,078,305	2,051,577	1,771,514	2,085,675
Other Domestic & Commercial Equip.	1,958,695	1,832,766	1,715,542	1,837,940
Appliances	1,759,665	1,829,202	1,590,095	1,558,589
Bolts, Nuts, Rivets, Screws	1,071,723	1,071,142	878,873	1,149,545
Agricultural	1,003,485	1,264,968	1,193,114	1,098,102
Forgings (except Automotive & Aircraft)	841,223	956,893	767,217	1,056,036
Shipbuilding, Marine Equipment	622,190	641,887	797,511	1,277,772
Oil & Gas Drilling	404,224	540,538	306,923	700,501
Mining, Quarrying, Lumbering	288,062	234,945	179,505	328,803
Ordnance, other Military	164,783	127,434	238,690	356,406
Aircraft	77,488	71,343	62,209	99,561
Totals	71,149,218	69,377,067	50,914,433	79,894,577

American Iron & Steel Institute.

WHERE THE STEEL GOES

1960



DISTRIBUTION

NET TONS

By Market Classifications	STAINLESS STEEL (And heat resisting) 1960	1959	1958	ALLOY STEEL (Other than stainless) 1960	1959	1958	CARBON STEEL 1960	1959	1958
Converters & Processors	44,267	46,342	55,060	76,903	67,832	52,967	2,807,056	3,019,233	2,746,547
Forgings (other than Automotive)	6,896	8,126	9,670	280,933	340,549	299,027	553,394	608,218	458,520
Bolts, Nuts, Rivets, Screws	5,224	6,114	5,699	69,938	66,607	45,968	996,561	998,421	827,206
Steel Service Centers	228,543	252,451	171,556	508,563	522,599	308,533	11,742,724	12,273,704	10,422,194
Construction, including Maintenance	8,887	5,837	8,645	183,547	100,419	98,821	9,471,053	8,407,922	8,615,083
Contractors' Products	15,698	16,614	13,736	14,274	15,412	11,343	3,572,072	3,541,170	3,442,110
Automotive	78,163	94,917	67,640	1,344,709	1,503,714	1,043,413	13,187,552	12,615,244	9,013,981
Rail Transportation	2,259	955	314	236,546	176,910	91,974	2,286,462	2,178,975	1,379,824
Shipbuilding, Marine Equipment	1,580	1,580	2,321	75,447	81,963	93,868	545,163	558,344	701,322
Aircraft	13,530	14,901	14,941	43,194	36,325	31,141	20,764	20,117	16,127
Oil & Gas Drilling	434	387	591	115,324	143,886	81,850	288,466	396,265	223,482
Mining, Quarrying, Lumbering	213	227	314	24,881	20,694	16,055	262,968	214,024	163,136
Agricultural	222	302	349	22,989	26,517	24,112	980,274	1,238,169	1,168,653
Machinery, Indus. Equip. & Tools	34,516	43,776	41,978	531,312	602,122	379,005	3,392,107	3,512,430	2,760,213
Electrical Machinery & Equipment	10,675	10,476	9,682	456,713	534,151	394,350	1,610,917	1,506,950	1,367,482
Appliances, Utensils, Cutlery	38,059	44,111	36,924	13,682	14,260	10,709	1,707,924	1,770,831	1,542,462
Other Domestic & Commercial Equip.	11,062	13,203	11,524	18,847	14,802	13,015	1,928,786	1,804,761	1,691,003
Containers	1,109	1,768	1,362	23,726	15,945	13,887	6,404,131	6,300,516	6,553,334
Ordnance, other Military	2,057	2,275	2,304	58,125	18,581	71,962	104,601	106,578	164,424
Export	41,281	17,666	14,740	143,123	113,594	147,567	2,378,414	1,277,217	2,266,842
Unclassified	33,852	32,566	24,142	138,665	173,496	114,282	1,947,861	1,823,006	553,147
Totals	578,527	614,594	493,492	4,381,441	4,590,378	3,343,849	66,189,250	64,172,095	56,077,092

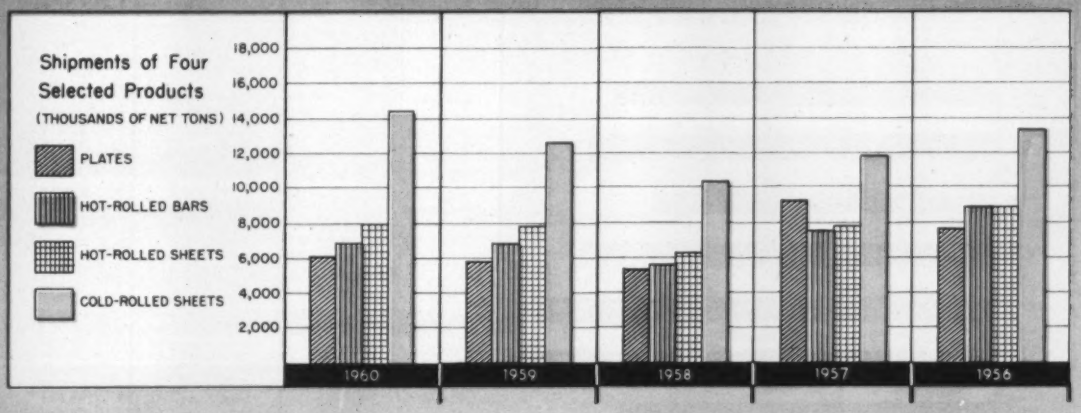
American Iron & Steel Institute.

Steel Shipments

METALWORKING FACTS AND FIGURES

SHIPMENTS OF STEEL PRODUCTS

(All grades, including carbon, alloy, and stainless)



Steel Products—Net tons	Shipments	%	Shipments	%	Shipments	%	Shipments	%	Shipments	%
Ingots & steel castings	337,642	0.5	334,918	0.5	267,422	0.5	467,456	0.6	702,744	0.9
Blooms, slabs, billets, sheet bars	1,418,451	2.0	1,498,620	2.2	1,142,116	1.9	2,307,901	2.9	2,275,640	2.7
Tube rounds	16,705	..	14,649	..	10,699	..	55,150	0.1	12,530	..
Skelp	130,204	0.2	41,209	..	113,546	0.2	152,949	0.2	197,825	0.2
Wire rods	918,195	1.3	980,266	1.4	894,936	1.5	961,913	1.2	1,132,434	1.4
Structural shapes (heavy)	4,835,832	6.8	4,090,535	5.9	3,964,608	6.6	6,817,796	8.5	5,348,981	6.4
Steel piling	422,860	0.6	340,689	0.5	439,972	0.7	569,673	0.7	434,103	0.5
Plates	6,131,587	8.6	5,819,156	8.4	5,268,420	8.8	9,248,625	11.6	7,714,623	9.3
Rails—Standard (over 60 lb)	667,912	0.9	590,039	0.9	539,320	0.9	1,194,406	1.5	1,201,354	1.4
Rails—All other	46,698	0.1	42,058	0.1	39,906	0.1	88,563	0.1	98,362	0.1
Joint bars	26,902	..	31,374	..	33,894	..	79,942	0.1	81,557	0.1
Tie plates	124,264	0.2	143,262	0.2	108,780	0.2	230,941	0.3	298,201	0.4
Track spikes	44,804	0.1	52,389	0.1	40,460	0.1	73,752	0.1	93,467	0.1
Wheels (rolled or forged)	243,310	0.3	232,749	0.3	155,711	0.3	386,512	0.5	345,396	0.4
Axles	111,784	0.2	97,102	0.1	70,795	0.1	210,760	0.3	171,780	0.2
Bars—Hot rolled (including light shapes)	6,915,435	9.7	6,936,291	10.0	5,646,563	9.4	7,567,400	9.5	8,840,349	10.6
Bars—Reinforcing	2,214,493	3.1	2,173,462	3.1	2,034,795	3.4	2,300,127	2.9	2,518,691	3.0
Bars—Cold finished	1,385,333	2.0	1,408,811	2.0	1,023,417	1.7	1,319,288	1.6	1,736,369	2.1
Tool steel	86,784	0.1	96,069	0.2	70,270	0.1	98,712	0.1	125,886	0.2
Standard pipe	2,131,697	3.0	2,210,524	3.2	2,174,939	3.6	2,664,469	3.3	2,927,306	3.5
Oil country goods	1,197,134	1.7	2,066,661	3.0	1,158,116	1.9	2,822,854	3.5	2,560,223	3.1
Line pipe	2,689,759	3.8	2,802,537	4.0	2,608,196	4.4	4,218,513	5.3	3,376,063	4.1
Mechanical tubing	762,582	1.0	970,344	1.4	561,243	0.9	773,945	1.0	949,846	1.1
Pressure tubing	271,252	0.4	260,616	0.4	245,353	0.4	395,346	0.5	384,988	0.5
Wire—Drawn	2,439,931	3.4	2,725,563	3.9	2,362,887	3.9	2,598,390	3.2	2,983,377	3.5
Wire—Nails & staples	320,402	0.5	391,694	0.6	417,704	0.7	447,301	0.6	587,283	0.7
Wire—Barbed & twisted	47,851	0.1	48,745	0.1	56,031	0.1	59,125	0.1	74,318	0.1
Wire—Woven wire fence	103,877	0.1	141,514	0.2	157,070	0.3	202,652	0.2	273,352	0.3
Wire—Bale ties and baling wire	62,707	0.1	55,542	0.1	57,386	0.1	48,132	0.1	49,672	0.1
Black plate	576,198	0.8	562,147	0.8	621,096	1.0	610,108	0.8	785,055	0.9
Tin & terne plate—Hot dipped	389,956	0.6	412,123	0.6	447,396	0.8	649,974	0.8	950,070	1.1
Tin plate—Electrolytic	5,075,502	7.1	4,858,511	7.0	5,040,190	8.4	4,676,482	5.8	4,615,068	5.6
Sheets—Hot rolled	7,990,748	11.2	7,844,519	11.3	6,291,266	10.5	7,829,992	9.8	8,790,540	10.6
Sheets—Cold rolled	14,466,261	20.3	12,751,072	18.4	10,325,661	17.2	11,879,354	14.9	13,317,002	16.0
Sheets—Galvanized	3,056,996	4.3	2,772,835	4.0	2,828,848	4.7	2,392,637	3.0	2,957,991	3.5
Sheets—All other coated	261,203	0.4	280,336	0.4	190,063	0.3	207,853	0.2	226,556	0.3
Electrical sheets & strip	567,820	0.8	632,310	0.9	476,205	0.8	618,863	0.8	813,381	1.0
Strip—Hot rolled	1,332,280	1.9	1,272,691	1.8	1,048,164	1.8	1,392,460	1.7	1,796,157	2.2
Strip—Cold rolled	1,325,802	1.8	1,393,100	2.0	981,009	1.7	1,274,262	1.6	1,544,646	1.8
Total steel products	71,149,218	100.0	69,377,067	100.0	59,914,433	100.0	79,894,577	100.0	83,251,168	100.0

1960 Shipments of Finished Steel by Types

(Net tons)

	Carbon	Alloy	Stainless	Totals		Carbon	Alloy	Stainless	Totals
Jan.	7,779,223	579,376	71,097	8,429,696	July	4,444,945	230,826	34,794	4,710,565
Feb.	6,954,991	563,135	64,907	7,583,033	Aug.	4,735,020	292,644	44,289	5,071,953
Mar.	7,357,015	551,642	57,224	7,965,881	Sept.	4,637,182	304,102	41,944	4,983,228
Apr.	6,302,126	394,255	45,428	6,741,809	Oct.	4,604,279	298,085	41,259	4,943,623
May	5,580,884	344,183	47,365	6,272,432	Nov.	4,193,267	274,931	42,822	4,516,020
June	5,552,302	323,201	45,357	5,920,860	Dec.	3,820,945	252,789	42,313	4,116,047
					Year's Totals†	56,189,250	4,331,441	575,527	71,149,218

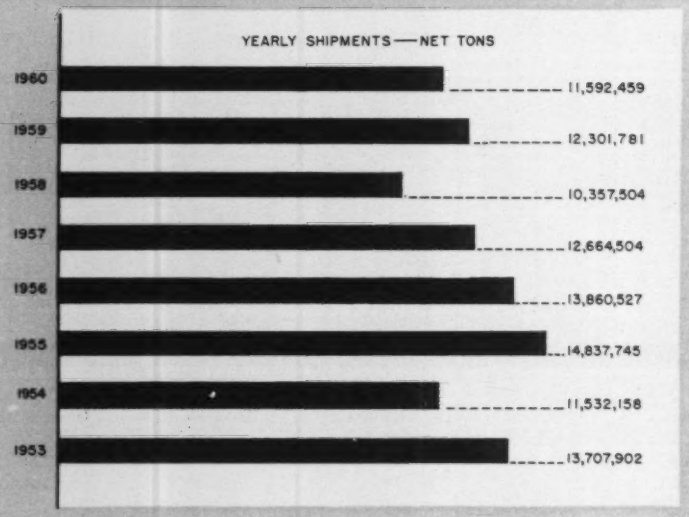
†Revisions that affect the year's totals are not shown in monthly figures.

American Iron & Steel Institute.

Castings

METALWORKING FACTS AND FIGURES

GRAY IRON CASTINGS



(Shipments—net tons)

	Miscellaneous	Ingot Molds	Chilled Iron Railroad Car Wheels	Cast Iron Pressure Pipe & Fittings	Cast Iron Soil Pipe & Fittings	For Sale	For Own Use
1960	7,021,374	2,246,552	203,863	1,335,589	782,051	6,401,914	5,190,515
Jan.	677,392	295,994	18,463	88,788	56,928	591,804	543,771
Feb.	678,927	284,738	17,848	76,332	49,876	571,143	536,578
Mar.	685,102	294,322	24,409	83,121	56,411	600,162	513,233
Apr.	609,234	232,895	21,737	118,856	68,605	580,590	470,767
May	613,745	207,094	20,414	136,155	75,090	588,770	484,028
June	622,236	183,049	19,810	144,773	79,770	601,597	448,041
July	478,269	120,784	16,226	128,652	67,375	450,580	352,726
Aug.	490,059	131,428	14,221	139,275	53,520	540,395	318,108
Sept.	554,788	125,658	13,460	135,327	71,234	527,227	373,270
Oct.	568,869	139,977	12,559	117,009	66,725	560,054	405,085
Nov.	538,817	123,054	12,410	102,959	58,469	454,611	381,098
Dec.	506,936	107,559	12,306	74,002	48,018	394,981	353,840
1959	7,546,664	2,142,498	309,945	1,440,883	861,791	6,988,199	5,313,582
Jan.	624,538	214,990	27,550	75,571	57,678	516,246	484,381
Feb.	642,116	230,706	31,035	75,476	56,178	537,370	498,141
Mar.	700,761	270,293	35,820	108,131	89,123	664,890	539,533
Apr.	725,339	270,476	35,655	129,581	83,227	687,611	556,947
May	705,307	275,563	36,960	141,675	75,601	684,141	550,965
June	706,525	268,479	30,723	160,510	84,605	715,923	534,949
July	598,656	99,670	20,486	133,175	79,542	531,768	399,801
Aug.	484,678	13,482	18,479	145,853	79,928	506,612	236,808
Sept.	594,669	19,416	16,272	142,660	75,882	527,001	321,898
Oct.	621,833	20,155	19,647	139,716	69,284	519,178	351,457
Nov.	492,742	165,139	16,723	96,088	59,670	514,888	315,472
Dec.	649,200	294,129	20,595	92,139	50,733	583,571	523,225
1958	6,146,186	1,884,396	265,114	1,277,685	784,123	5,849,426	4,508,078
Jan.	579,779	135,110	23,511	78,863	49,848	435,254	431,857
Feb.	502,409	116,168	25,959	67,606	40,920	388,564	363,598
Mar.	498,965	125,887	24,777	87,716	57,059	445,678	348,746
Apr.	483,233	121,489	25,401	112,292	63,161	456,354	349,222
May	468,260	134,312	23,498	123,017	69,823	471,048	347,862
June	502,486	135,477	22,928	129,671	76,242	540,760	326,044
July	430,117	157,478	19,928	110,790	72,103	464,506	325,910
Aug.	410,110	165,006	18,537	129,157	78,519	512,718	288,611
Sept.	517,419	175,323	20,783	125,693	76,342	536,573	378,987
Oct.	550,614	207,500	22,970	129,375	81,127	585,470	406,116
Nov.	574,820	201,704	18,801	98,326	63,511	504,146	453,016
Dec.	627,954	208,942	18,921	85,179	56,368	508,355	488,109
1957	7,786,229	2,409,290	359,332	1,351,345	758,306	6,876,497	5,788,607
1956	8,265,526	2,624,146	406,191	1,716,902	817,762	7,960,391	5,900,136
1955	9,156,253	2,739,874	385,041	1,687,062	869,515	7,966,735	6,871,010
1954	7,291,912	1,784,625	336,239	1,375,671	743,711	6,322,989	5,209,169
1953	8,449,837	2,828,159	467,142	1,285,598	677,166	7,494,843	6,213,059

U. S. Bureau of the Census.

MALLEABLE IRON CASTINGS

(Shipments—net tons)

	For Sale	For Own Use	Totals
1960	466,571	354,130	820,701
Jan.	46,154	37,034	83,188
Feb.	46,850	36,268	83,118
Mar.	49,907	36,336	86,243
Apr.	39,059	32,212	71,271
May	37,618	31,324	68,942
June	43,105	29,488	72,593
July	28,575	21,285	49,860
Aug.	36,765	22,020	58,785
Sept.	36,114	26,934	63,048
Oct.	35,492	28,029	63,521
Nov.	35,432	27,546	62,978
Dec.	31,500	25,654	57,154
1959	557,303	359,059	916,362
Jan.	43,667	29,519	73,186
Feb.	42,093	32,667	74,760
Mar.	49,690	34,645	84,335
Apr.	54,306	36,668	90,974
May	49,619	33,853	83,472
June	51,411	34,086	85,497
July	43,128	26,056	69,184
Aug.	40,143	24,919	65,062
Sept.	46,469	29,594	76,063
Oct.	48,625	26,886	75,511
Nov.	42,235	16,023	58,258
Dec.	45,917	34,143	80,060
1958	383,839	276,811	660,650
Jan.	34,920	27,814	62,734
Feb.	31,006	23,644	54,650
Mar.	29,624	22,084	51,708
Apr.	29,388	21,307	50,695
May	26,656	21,650	48,306
June	31,077	20,805	51,882
July	21,479	17,386	41,865
Aug.	29,414	19,838	49,252
Sept.	31,999	24,837	56,836
Oct.	40,014	20,967	60,981
Nov.	35,221	28,135	63,356
Dec.	40,041	28,344	68,385
1957	520,118	342,858	862,976
1956	557,636	394,232	951,868
1955	652,552	452,223	1,104,775
1954	461,925	360,091	822,016
1953	578,749	391,757	970,506
1952	573,472	352,648	926,120

Standard Malleable

(Shipments—net tons)

	For Sale	For Own Use	Totals
1960	370,794	260,788	631,582
Jan.	35,933	27,704	63,637
Feb.	37,391	26,740	64,131
Mar.	40,422	27,026	67,448
Apr.	32,066	24,070	56,136
May	30,126	22,982	53,108
June	34,526	21,430	55,956
July	22,477	14,710	37,187
Aug.	29,077	17,445	46,522
Sept.	28,623	20,012	48,635
Oct.	27,813	20,119	47,932
Nov.	27,611	19,960	47,571
Dec.	24,729	18,590	43,319
1959	449,946	279,922	729,868
1958	313,597	227,003	540,600
1957	431,662	281,877	713,539

Pearlitic Malleable

(Shipments—net tons)

	For Sale	For Own Use	Totals
1960	95,777	93,342	189,119
Jan.	10,221	9,330	19,551
Feb.	9,459	9,528	18,987
Mar.	9,485	9,310	18,795
Apr.	6,993	8,142	15,135
May	7,492	8,342	15,834
June	8,579	8,058	16,637
July	6,098	6,575	12,673
Aug.	7,688	4,575	12,263
Sept.	7,491	6,922	14,413
Oct.	7,679	7,910	15,589
Nov.	7,821	7,586	15,407
Dec.	6,771	7,064	13,835
1959	107,357	79,137	186,494
1958	70,242	49,808	120,050
1957	88,456	60,981	149,437

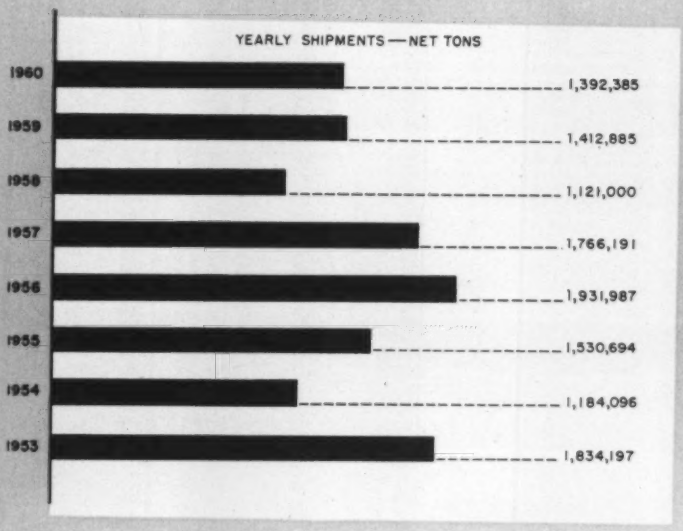
U. S. Bureau of the Census.

Castings

METALWORKING FACTS AND FIGURES

STEEL CASTINGS

(Shipments—net tons)



	Carbon	Alloy, Including Stainless	For Sale	For Own Use	Totals
1960	1,016,068	376,317	1,071,910	320,475	1,392,385
Jan.	93,197	29,368	94,052	28,513	122,565
Feb.	96,888	32,371	97,927	31,332	129,259
Mar.	101,742	35,966	109,448	34,020	143,708
Apr.	93,133	33,786	96,567	30,662	127,219
May	93,700	32,980	97,231	29,319	126,550
June	101,291	35,698	107,076	29,916	136,992
July	63,753	25,812	67,294	22,271	89,565
Aug.	73,338	28,371	77,146	24,563	101,709
Sept.	74,447	29,851	79,556	24,742	104,298
Oct.	72,544	30,120	79,622	23,042	102,664
Nov.	69,927	29,650	78,305	21,272	99,577
Dec.	76,808	29,444	87,456	20,793	108,249
1959	1,043,538	369,317	1,112,668	300,217	1,412,885
Jan.	76,212	29,150	82,653	22,709	105,362
Feb.	79,633	30,615	86,013	24,267	110,280
Mar.	96,509	35,008	103,848	27,669	131,517
Apr.	99,295	35,019	104,890	29,454	134,344
May	101,504	33,955	105,804	29,555	135,359
June	107,000	36,624	111,725	31,899	143,624
July	77,990	28,158	83,510	22,908	106,148
Aug.	74,825	23,189	79,188	18,826	98,014
Sept.	73,618	26,083	79,983	19,768	99,751
Oct.	80,127	25,443	84,850	20,720	105,570
Nov.	77,329	32,140	86,026	23,434	109,460
Dec.	99,643	33,703	104,138	29,268	133,316
1958	801,816	319,184	856,986	264,014	1,121,000
Jan.	87,525	33,197	94,717	26,005	120,722
Feb.	74,283	29,014	79,708	23,589	103,297
Mar.	77,564	28,669	82,195	24,038	106,233
Apr.	65,639	25,825	69,121	22,343	91,464
May	61,105	25,897	66,086	20,916	87,002
June	67,227	25,634	71,624	21,237	92,861
July	46,858	21,944	48,618	20,184	68,802
Aug.	57,539	23,347	59,816	21,070	80,886
Sept.	60,362	24,885	64,596	20,691	85,277
Oct.	67,906	27,483	73,267	22,022	95,289
Nov.	59,783	25,474	65,788	19,479	85,267
Dec.	76,015	27,785	81,360	22,440	103,800
1957	1,328,478	437,713	1,359,747	406,444	1,766,191
1956	1,444,768	487,219	1,512,290	419,697	1,931,987
1955	1,068,489	442,205	1,166,706	363,988	1,530,694
1954	802,811	381,285	878,360	305,736	1,184,096
1953	1,276,729	557,468	1,400,013	434,184	1,834,197

U. S. Bureau of the Census.

Iron and Steel Castings

(Shipments, all types—net tons)

	For Sale	For Own Use	Totals
1960	7,940,395	5,865,150	13,805,545
Jan.	732,010	609,318	1,341,328
Feb.	715,920	601,178	1,320,098
Mar.	759,757	613,589	1,373,346
Apr.	716,206	533,641	1,249,847
May	723,619	524,701	1,248,320
June	751,778	507,445	1,259,223
July	546,449	396,282	942,731
Aug.	654,306	364,691	1,018,997
Sept.	642,897	424,946	1,067,843
Oct.	615,168	456,156	1,071,324
Nov.	568,348	429,916	998,264
Dec.	513,937	400,287	914,224
1959	8,658,170	5,972,858	14,631,028
Jan.	642,596	536,609	1,179,205
Feb.	665,476	555,075	1,220,551
Mar.	818,428	601,652	1,420,080
Apr.	846,807	623,069	1,469,876
May	839,564	614,373	1,453,937
June	879,059	600,934	1,479,993
July	658,436	448,765	1,107,201
Aug.	624,943	280,553	905,496
Sept.	653,433	371,260	1,024,693
Oct.	652,653	399,063	1,051,716
Nov.	643,149	354,929	998,078
Dec.	733,626	586,576	1,320,202
1958	7,090,251	5,048,903	12,139,154
1957	8,756,362	6,537,309	15,293,671
1956	10,030,317	6,714,065	16,744,382
1955	9,785,993	7,687,221	17,473,214
1954	7,663,274	5,874,996	13,538,270
1953	9,473,605	7,039,000	16,512,605

U. S. Bureau of the Census.

High Alloy Castings

(Total U. S. production—tons)

	Heat Resistant	Corrosion Resistant	Abrasion Resistant	Totals‡
1960*	16,432	16,998	3,500	36,930
1st Qtr	4,466	4,039	1,225	9,730
2nd Qtr	4,589	4,522	1,085	10,197
3rd Qtr	3,532	4,172	385	8,088
4th Qtr	3,846	4,265	805	8,916
1959	15,247	15,398	3,374	34,019
1st Qtr	3,398	3,552	849	7,799
2nd Qtr	4,291	4,151	964	9,407
3rd Qtr	3,649	3,793	578	8,020
4th Qtr	3,910	3,902	983	8,794
1958	10,930	13,922	2,151	27,003
1957	15,798	17,968	4,064	37,832
1956	18,994	18,353	5,277	42,624
1955	15,250	12,871	5,107	33,228
1954	14,554	12,158	4,213	30,926
1953	19,656	14,576	4,353	38,585
1952	20,404	13,099	3,914	37,416
1951	19,139	14,386	3,066	36,590
1950	13,447	9,517	1,661	24,624
1949	9,896	6,499	750	17,145
1948	12,015	8,143	1,263	21,420
1947	10,753	8,173	767	19,693

‡Totals may not be precise because of rounded data.
*Preliminary.
Alloy Casting Institute.

NONFERROUS CASTINGS

Zinc and Zinc-Base Alloy Castings

(Shipments—thousands of pounds)

	Die	All Other	Totals
1960	614,337	8,687	623,024
Jan.	60,660	877	61,537
Feb.	62,284	641	62,925
Mar.	60,043	773	60,816
Apr.	46,749	804	47,553
May	50,471	373	50,844
June	50,062	747	50,809
July	34,502	615	35,117
Aug.	44,336	765	45,101
Sept.	51,727	787	52,514
Oct.	55,521	684	56,205
Nov.	52,597	977	53,574
Dec.	45,385	644	46,029
1959	624,412	6,798	631,210
Jan.	52,821	509	53,330
Feb.	48,675	584	49,259
Mar.	54,957	534	55,491
Apr.	54,746	470	55,216
May	57,874	673	58,547
June	53,498	519	54,017
July	44,154	492	44,646
Aug.	43,975	481	44,456
Sept.	55,292	743	56,035
Oct.	56,380	726	57,106
Nov.	44,202	409	44,611
Dec.	57,838	658	58,496
1958	484,609	5,462	500,071
1957	664,439	5,336	669,775
1956	687,421	6,896	694,317
1955	769,480	8,520	778,000

U. S. Bureau of the Census.

Magnesium and Magnesium-Base Alloy Castings

(Shipments—thousands of pounds)

	1960	1959	1958	1957	1956
Jan.	2,135	2,281	2,018	3,207	2,959
Feb.	2,075	2,239	1,873	2,661	2,977
Mar.	1,903	2,119	2,089	2,970	3,046
Apr.	1,926	2,447	2,332	2,896	3,140
May	1,953	2,360	2,538	2,832	3,021
June	2,050	2,474	2,335	2,973	2,949
July	1,683	2,254	2,366	2,544	2,810
Aug.	2,025	2,233	1,941	2,315	3,059
Sept.	2,146	2,223	2,977	2,279	3,079
Oct.	2,038	2,426	2,747	2,192	3,442
Nov.	1,776	2,013	2,754	1,920	2,892
Dec.	1,875	2,154	2,806	1,533	2,794
Totals	23,585	27,253	28,776	30,322	36,168

YEARLY SHIPMENTS

1955	27,854	1953	34,517
1954	25,777	1952	34,857

U. S. Bureau of the Census.

Lead and Lead-Base Alloy Die Castings

(Shipments—thousands of pounds)

	1960	1959	1958	1957	1956
Jan.	1,496	1,599	1,591	1,883	1,598
Feb.	1,628	1,315	1,309	1,435	1,636
Mar.	1,994	1,765	1,651	1,865	1,644
Apr.	2,030	1,862	1,486	2,070	1,910
May	1,935	2,025	1,689	2,373	1,919
June	2,009	2,007	2,015	2,336	1,833
July	1,448	1,858	1,437	2,079	1,551
Aug.	1,689	1,898	1,840	2,165	2,112
Sept.	1,806	2,218	1,761	2,115	1,539
Oct.	1,760	2,068	1,737	2,481	2,206
Nov.	1,566	1,755	1,428	1,590	1,788
Dec.	1,277	1,346	1,512	1,399	1,483
Totals	20,638	21,716	19,456	23,791	21,219

YEARLY TOTALS

1955	21,117	1953	20,444
1954	18,396	1952	20,941

U. S. Bureau of the Census.

Aluminum and Aluminum-Base Alloy Castings

(Shipments—thousands of pounds)

	Sand	Permanent Mold	Die	Other	Totals
1960	129,857	257,784	361,797	995	750,413
Jan.	11,278	22,388	34,514	87	68,247
Feb.	11,800	23,614	36,177	108	71,699
Mar.	12,934	22,413	36,749	120	72,216
Apr.	12,339	19,950	29,400	108	61,797
May	10,682	21,507	28,055	86	60,330
June	11,280	20,953	27,722	113	60,068
July	8,765	15,804	20,973	152	45,694
Aug.	10,639	18,901	29,256	52	58,848
Sept.	10,514	22,031	29,527	44	62,116
Oct.	10,149	23,339	30,213	49	63,750
Nov.	9,901	23,612	29,831	64	63,408
Dec.	9,576	23,272	29,380	12	62,240
1959	141,987	274,855	368,101	1,156	786,399
Jan.	11,183	25,122	32,728	96	69,129
Feb.	10,747	25,706	32,062	92	68,607
Mar.	12,357	27,242	33,864	114	73,577
Apr.	12,644	26,430	33,907	132	73,113
May	11,924	25,561	30,792	129	68,406
June	12,251	25,204	29,007	147	66,609
July	11,526	20,687	24,701	134	57,048
Aug.	11,074	18,102	26,733	132	56,041
Sept.	12,254	21,783	32,154	140	66,331
Oct.	13,902	22,058	32,555	120	67,635
Nov.	10,757	16,604	27,219	115	54,695
Dec.	12,368	20,356	32,379	105	65,208
1958	125,487	224,092	290,275	1,846	641,700
1957	143,991	232,326	373,586	1,915	751,818
1956	171,781	245,421	376,230	1,149	794,581
1955	165,482	298,349	355,203	1,746	820,780
1954	156,555	214,407	245,291	6,801	623,054
1953	214,553	200,025	239,330	4,114	658,022
1952	194,616	146,883	169,732	7,748	518,979

U. S. Bureau of the Census.

Copper and Copper-Base Alloy Castings

(Shipments—thousands of pounds)

	Sand	Permanent Mold	Die	Other	Totals
1960	670,331	45,443	13,450	32,942	762,166
Jan.	65,742	3,915	1,371	2,943	73,971
Feb.	63,103	4,146	1,282	3,266	71,797
Mar.	66,517	4,346	1,381	3,664	75,908
Apr.	58,453	4,523	1,162	2,639	66,777
May	57,848	4,463	1,153	2,835	66,299
June	56,441	3,715	1,180	3,249	64,585
July	42,778	2,910	929	1,854	48,471
Aug.	56,344	3,669	1,399	2,353	63,765
Sept.	54,104	3,699	929	2,630	61,362
Oct.	52,734	3,556	1,000	2,587	59,877
Nov.	50,043	3,132	886	2,317	56,358
Dec.	46,224	3,369	798	2,605	52,996
1959	765,246	52,456	14,187	39,143	871,032
Jan.	59,869	3,701	1,260	2,844	67,674
Feb.	62,161	4,025	1,237	2,882	70,305
Mar.	67,075	4,281	1,361	3,475	76,192
Apr.	71,270	4,588	1,328	3,264	80,450
May	66,954	4,311	1,290	3,408	75,963
June	68,439	4,370	1,175	3,298	77,282
July	59,254	3,817	946	2,608	66,625
Aug.	57,949	4,359	993	3,230	66,531
Sept.	63,813	4,758	1,138	3,581	73,290
Oct.	67,186	5,120	1,169	3,910	77,385
Nov.	59,094	4,840	1,160	3,131	68,225
Dec.	62,182	4,286	1,130	3,512	71,110
1958	697,360	31,854	10,148	23,122	762,484
1957	789,014	44,789	10,776	30,048	874,627
1956	866,545	57,522	10,075	32,164	966,306
1955	905,867	63,111	8,512	31,408	1,008,898
1954	751,917	48,848	6,509	27,394	834,668
1953	888,369	61,316	10,077	30,734	990,496
1952	910,862	63,865	8,259	26,924	1,009,910

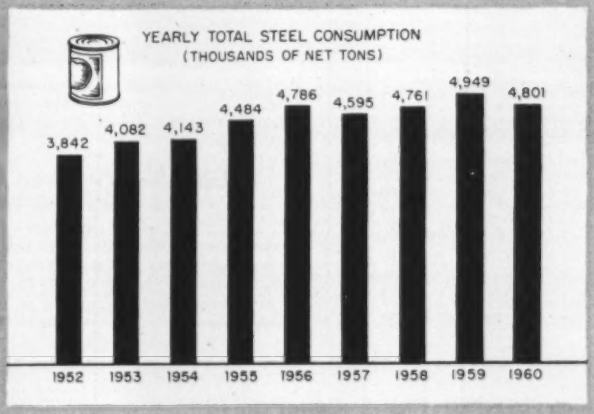
U. S. Bureau of the Census.

Containers & Closures

METALWORKING FACTS AND FIGURES

TIN PLATE CANS

(Shipments in terms of net tons of steel consumed)



	Food Cans	Nonfood Cans	Totals	For Sale
1960	2,937,862	1,862,814	4,800,676	4,116,261
Jan.	180,785	120,010	300,795	250,724
Feb.	171,249	116,713	287,962	237,178
Mar.	184,170	145,864	330,034	273,290
Apr.	208,728	154,122	362,850	299,916
May	231,521	176,279	407,800	344,846
June	230,444	194,037	424,481	362,794
July	275,463	177,714	453,177	398,737
Aug.	409,398	191,207	600,605	535,292
Sept.	390,343	162,614	552,957	484,066
Oct.	272,079	144,217	416,296	357,692
Nov.	188,136	129,801	317,937	272,474
Dec.	195,546	150,236	345,782	299,252
1959	2,943,607	2,005,348	4,948,955	4,300,584
Jan.	179,074	134,918	313,992	262,734
Feb.	174,258	129,680	303,938	256,580
Mar.	185,528	155,567	341,095	287,316
Apr.	215,742	170,996	386,738	326,769
May	219,273	181,368	400,641	346,576
June	251,499	193,451	444,950	385,711
July	301,798	200,927	502,725	450,916
Aug.	422,657	192,310	614,967	546,317
Sept.	411,758	230,322	642,080	577,221
Oct.	235,176	148,051	383,227	328,114
Nov.	170,219	127,462	297,681	258,326
Dec.	176,625	140,296	316,921	273,954
1958	2,911,521	1,849,183	4,760,704	4,091,266
Jan.	191,319	132,820	324,139	270,552
Feb.	182,205	124,145	306,350	260,315
Mar.	214,189	139,421	353,610	306,317
Apr.	178,860	142,042	320,902	263,880
May	198,463	167,432	365,895	307,083
June	222,535	186,243	408,778	352,469
July	288,590	189,210	477,800	417,980
Aug.	418,405	174,753	593,158	524,133
Sept.	392,306	164,100	556,406	480,502
Oct.	287,594	161,663	449,257	390,800
Nov.	183,989	131,790	315,750	272,808
Dec.	153,036	135,564	288,650	244,427
1957	2,816,293	1,778,675	4,594,968	3,962,109
1956	3,011,980	1,773,691	4,785,671	4,113,401
1955	2,801,601	1,682,398	4,483,999	3,909,855
1954	2,605,124	1,538,205	4,143,329	3,657,604
1953	2,614,764	1,467,490	4,082,254	3,571,489
1952	2,554,874	1,287,296	3,842,170	3,340,899

U. S. Bureau of the Census.

Aluminum Cans

(Shipments, net tons of aluminum consumed)

1960			
Jan.	1,582	July	1,529
Feb.	1,649	Aug.	1,731
Mar.	1,695	Sept.	1,534
Apr.	1,550	Oct.	1,504
May	1,713	Nov.	1,572
June	1,791	Dec.	1,800

U. S. Bureau of the Census.

Metal Closures for Glass Containers

(Shipments in thousands of units)

	Commercial Closures	Home Canning Closures
1960	14,888,471	12,234,291
January	1,112,179	670,374
February	1,191,057	947,039
March	1,273,370	1,253,677
April	1,165,114	1,083,022
May	1,315,054	1,907,367
June	1,394,096	1,690,737
July	1,178,951	1,553,134
August	1,476,697	1,591,933
September	1,435,988	767,180
October	1,232,101	112,270
November	1,131,223	303,593
December	982,641	353,965
1959	15,418,879	13,049,212
1958	14,653,099	14,381,865
1957	13,742,356	12,923,527
1956	14,217,467	14,305,032

U. S. Bureau of the Census.

Crowns

(Shipments in gross)

	1960	1959	1958
Jan.	19,138,143	23,577,362	29,518,438
Feb.	18,466,012	20,803,309	48,070,949
Mar.	23,595,513	25,398,214	14,867,451
Apr.	25,048,022	26,797,954	16,829,012
May	27,522,779	29,602,438	21,824,210
June	34,325,883	35,315,183	27,601,464
July	26,100,553	32,305,097	27,676,378
Aug.	30,648,948	29,315,634	26,591,418
Sept.	26,878,497	28,263,447	24,089,091
Oct.	19,859,894	26,400,320	23,944,794
Nov.	19,435,391	19,7 6,593	25,503,020
Dec.	20,980,841	25,191,307	20,249,040
Totals	292,000,476	322,726,858	306,765,265

YEARLY TOTALS

1957.... 313,772,070 1956.... 310,202,831

U. S. Bureau of the Census.

Steel Barrels, Drums, and Pails

(Shipments in thousands of units)

	Heavy Type	Light Type	Grease Drums	Pails
1960	17,948	9,536	3,104	71,515
Jan.	1,565	822	243	5,430
Feb.	1,246	708	178	5,125
Mar.	1,453	750	246	5,584
Apr.	1,471	770	242	5,894
May	1,624	848	269	6,610
June	1,680	834	305	7,198
July	1,601	787	261	6,406
Aug.	1,552	831	340	7,070
Sept.	1,549	802	297	6,462
Oct.	1,498	824	217	5,748
Nov	1,424	795	287	5,208
Dec.	1,385	765	219	4,744
1959	20,468	10,172	2,891	80,649
Jan.	1,560	795	243	5,013
Feb.	1,572	746	238	5,476
Mar.	1,770	881	247	6,639
Apr.	1,881	909	276	7,724
May	2,199	935	324	8,214
June	2,572	987	275	9,163
July	1,781	831	245	7,294
Aug.	1,507	793	178	6,734
Sept.	1,431	796	125	6,741
Oct.	1,098	821	189	5,966
Nov.	1,214	803	244	5,371
Dec.	1,973	875	307	6,314
1958	19,017	9,315	3,158	72,179
1957	21,970	10,583	3,148	73,678
1956	23,012	11,768	3,210	82,097

U. S. Bureau of the Census.

Prices

METALWORKING FACTS AND FIGURES

1960 WEEKLY INDEX OF FINISHED STEEL PRICES

(U. S. Bureau of Labor Statistics—1947-49=100)

Week Ended	Index	Week Ended	Index	Week Ended	Index	Week Ended	Index
Jan. 5	186.8	Apr. 5	186.8	July 5	186.2	Oct. 4	186.2
Jan. 12	186.8	Apr. 12	186.8	July 12	186.2	Oct. 11	186.2
Jan. 19	186.8	Apr. 19	186.8	July 19	186.2	Oct. 18	186.2
Jan. 26	186.8	Apr. 26	186.8	July 26	186.2	Oct. 25	186.2
Jan. Index.	186.8	Apr. Index.	186.8	July Index.	186.2	Oct. Index.	186.2
Feb. 2	186.8	May 3	186.8	Aug. 2	186.2	Nov. 1	186.2
Feb. 9	186.8	May 10	186.8	Aug. 9	186.2	Nov. 8	186.2
Feb. 16	186.8	May 17	186.8	Aug. 16	186.2	Nov. 15	186.2
Feb. 23	186.8	May 24	186.8	Aug. 23	186.2	Nov. 22	186.2
Feb. Index.	186.8	May 31	186.6	Aug. 30	186.2	Nov. 29	186.2
		May Index.	186.8	Aug. Index.	186.2	Nov. Index.	186.2
Mar. 1	186.8						
Mar. 8	186.8	June 7	186.6	Sept. 6	186.2	Dec. 6	186.2
Mar. 15	186.8	June 14	186.6	Sept. 13	186.2	Dec. 13	186.2
Mar. 22	186.8	June 21	186.6	Sept. 20	186.2	Dec. 20	186.2
Mar. 29	186.8	June 28	186.6	Sept. 27	186.2	Dec. 27	186.2
Mar. Index.	186.8	June Index.	186.6	Sept. Index.	186.2	Dec. Index.	186.2

Beehive Metallurgical Coke

(Average price, net ton)

	1960	1959	1958	1957
Connellsville, furnace	$15.00	$15.01	$15.25	$15.22
Connellsville, foundry	18.25	18.25	18.25	18.12

Oven Foundry Coke

(Average price, net ton)

Ovens	1960	1959	1958	1957
Kearny, N. J.	$31.25	$31.19	$29.75	$29.77
Milwaukee	32.00	31.94	30.50	30.50

Lake Superior Iron Ore

(Per gross ton; 51.50% iron)

	1960	1959	1958	1957
Bessemer Old Range	$11.85	$11.85	$11.85	$11.85
Bessemer Mesabi	11.60	11.60	11.60	11.60
Nonbessemer Old Range	11.70	11.70	11.70	11.70
Nonbessemer Mesabi	11.45	11.45	11.45	11.45
High phosphorus	11.45	11.45	11.45	11.45

FINISHED STEEL—WEIGHTED PRICE COMPOSITE

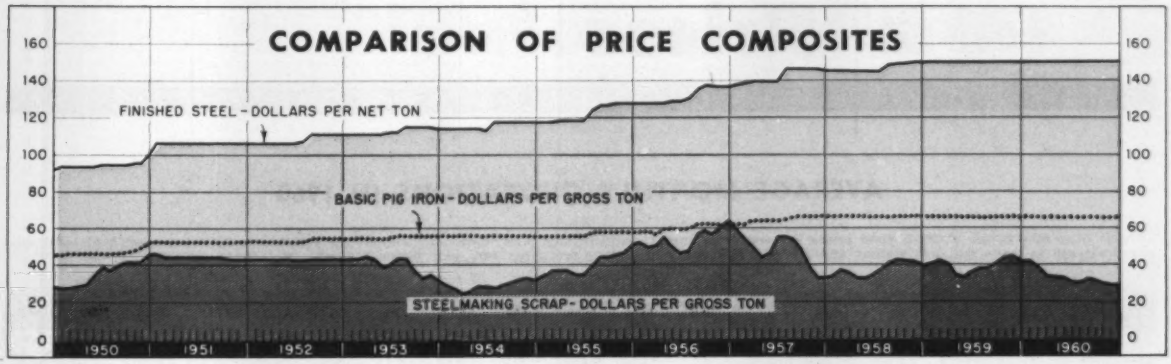
(Based on average shipments and prices during five-year base period, 1935-39: Structural shapes, plates, rails, hot rolled and cold finished bars, pipe, wire, nails, tin plate, hot and cold rolled sheets, galvanized sheets, hot and cold rolled strip)

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Avg
1960	247.82	247.82	247.82	247.82	247.82	247.82	247.82	247.82	247.82	247.82	247.82	247.82	247.82
1959	247.82	247.82	247.82	247.82	247.82	247.82	247.82	247.82	247.82	247.82	247.82	247.82	247.82
1958	239.15	239.15	239.15	239.15	239.15	239.15	239.15	246.33	246.65	246.65	247.82	247.82	242.44
1957	225.92	226.81	227.41	227.41	228.59	228.59	237.04	239.15	239.15	239.15	239.15	239.15	233.13
1956	209.10	209.10	209.10	209.10	210.45	210.45	210.45	221.90	225.71	225.58	225.92	225.92	216.06
1955	194.53	194.53	194.53	194.53	194.53	194.53	207.59	207.56	207.56	208.90	208.90	208.90	201.38
1954	189.74	189.74	189.74	189.74	189.74	189.75	194.19	194.19	194.19	194.53	194.53	194.53	192.05
1953	181.31	181.31	181.31	181.31	182.24	186.06	189.35	189.38	189.80	189.91	189.91	189.74	185.97
1952	171.92	171.92	171.92	171.92	171.92	171.92	173.83	181.31	181.31	181.31	181.31	181.31	175.99
1951	171.92	171.92	171.92	171.92	171.92	171.92	171.92	171.92	171.92	171.92	171.92	171.92	171.92
1950	156.13	156.13	156.13	156.13	156.13	156.54	156.69	156.95	156.99	157.53	157.76	167.87	157.57
1949	155.05	155.05	154.85	154.01	152.90	152.90	152.80	152.52	152.52	152.52	152.52	154.75	153.53
1948	132.93	134.56	135.91	135.91	135.02	134.56	143.08	151.99	151.86	151.86	151.86	151.86	142.62
1947	117.90	118.67	118.67	118.67	118.67	118.67	120.39	128.96	128.96	128.96	129.28	129.28	123.09
1946	101.87	106.32	111.62	111.62	111.62	111.86	112.04	112.04	112.04	112.04	112.04	112.82	110.70
1945	100.32	100.65	100.65	100.65	101.10	101.78	101.78	101.85	101.87	101.87	101.87	101.87	101.36
1944	99.16	99.16	99.16	99.16	99.16	99.16	99.16	99.16	99.16	99.16	99.16	99.16	99.16

FINISHED STEEL—ANNUAL PRICE AVERAGES

(Per net ton, Pittsburgh)

	SHEETS			STRIP		Tin	BARS					Basic	Standard
	H.R.	C.R.	Galv.	H.R.	C.R.	Plate	H.R.	C.F.	Plates	Shapes	Wire	Nails
1960	$102.00	$125.50	$137.50	$102.00	$148.50	$213.00	$113.50	$153.00	$106.00	$110.00	$160.00	$179.00
1959	102.00	125.50	137.50	102.00	148.50	213.00	113.50	153.00	106.00	110.00	160.00	179.00
1958	99.96	122.88	134.29	99.96	145.29	207.17	110.58	148.92	103.60	107.30	155.92	179.00
1957	95.92	117.90	128.90	95.92	139.90	203.67	104.88	141.35	99.42	103.28	148.35	174.25
1956	89.27	109.86	120.56	89.27	129.75	194.67	96.35	129.95	92.77	95.17	136.75	157.19
1955	83.75	102.75	113.00	83.75	120.12	183.00	89.50	113.00	87.25	88.50	120.00	144.50
1954	79.75	97.25	107.25	79.75	112.00	179.50	84.50	106.00	83.25	83.50	112.75	134.00
1953	77.60	93.70	103.70	85.34	111.25	179.00	81.20	101.52	80.20	79.75	108.26	129.08
1952	74.52	88.95	98.38	79.51	104.39	176.17	76.17	94.25	75.73	74.73	101.88	123.03
1951	73.00	87.00	96.00	77.60	101.60	174.00	74.00	91.00	74.00	73.00	98.60	120.00
1950	67.50	82.42	88.67	68.33	86.29	156.00	69.42	83.29	70.33	68.42	91.13	107.67
1949	65.22	80.05	88.00	67.75	84.33	156.00	67.55	80.04	68.75	65.24	84.05	105.92
1948	60.17	74.83	82.50	62.40	80.38	135.75	62.84	75.63	63.84	60.17	80.10	107.33
1947	52.60	67.03	74.05	52.60	67.03	116.00	54.60	67.03	55.53	52.53	70.67	84.44
1946	48.63	64.90	79.50	47.33	60.56	104.38	49.46	61.21	49.38	46.38	60.25	69.61
1945	43.92	61.00	73.50	42.00	56.00	100.00	44.25	53.83	44.50	42.00	53.83	57.08
1944	42.00	61.00	70.00	42.00	56.00	100.00	43.00	53.00	42.00	42.00	52.00	51.00
1943	42.00	61.00	70.00	42.00	56.00	100.00	43.00	53.00	42.00	42.00	52.00	51.00
1942	42.00	61.00	70.00	42.00	56.00	100.00	43.00	53.00	42.00	42.00	52.00	51.00
1941	42.00	61.00	70.00	42.00	56.00	100.00	43.00	53.00	42.00	42.00	52.00	51.00
1940	41.80	60.80	70.00	41.75	55.75	100.00	43.00	53.00	42.00	42.00	52.00	51.00
1939	41.25	62.08	70.00	41.25	57.08	100.00	43.75	53.33	42.00	42.00	52.00	49.17
1938	45.42	66.67	72.92	45.25	61.08	106.00	47.00	56.00	43.50	43.50	55.00	52.00



FINISHED STEEL—ARITHMETICAL PRICE COMPOSITE

(In dollars per net ton, computed from industry-wide prices on carbon steel: Hot rolled sheets, cold rolled sheets, cold rolled strip, hot rolled bars, plates, structural shapes, basic wire, standard nails, tin plate, and standard and line pipe. Based on mill prices.)

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Avg
1960.....	$149.96	$149.96	$149.96	$149.96	$149.96	$149.96	$149.96	$149.96	$149.96	$149.96	$149.96	$149.96	$149.96
1959.....	149.96	149.96	149.96	149.96	149.96	149.96	149.96	149.96	149.96	149.96	149.96	149.96	149.96
1958.....	145.42	145.42	145.42	145.42	145.42	145.42	145.42	148.55	149.28	149.28	149.96	149.96	147.08
1957.....	138.60	139.38	139.71	139.71	140.24	140.24	146.10	146.19	146.19	146.03	146.03	145.66	142.84
1956.....	128.02	128.02	128.02	128.02	128.98	128.98	130.85	136.28	137.75	137.48	137.66	137.79	132.32
1955.....	117.82	117.82	118.40	118.45	118.45	118.45	124.59	127.41	127.41	128.14	128.14	127.75	122.74
1954.....	113.91	113.91	113.75	113.70	113.70	113.20	117.52	117.74	117.77	117.95	117.95	117.95	115.75
1953.....	110.98	110.98	110.98	110.98	111.13	112.49	112.51	115.56	115.56	115.42	115.18	114.41	113.02
1952.....	106.32	106.32	106.32	106.32	106.32	106.32	107.25	110.98	110.98	110.98	110.98	110.98	108.34
1951.....	106.32	106.32	106.32	106.32	106.32	106.32	106.32	106.32	106.32	106.32	106.32	106.32	106.32
1950.....	92.92	93.09	93.18	93.19	93.65	94.35	94.36	94.44	94.50	94.91	95.09	100.76	94.54
1949.....	97.75	97.77	97.17	94.18	93.36	92.06	91.82	91.62	91.55	91.62	91.64	91.89	93.54

STEELMAKING SCRAP PRICE COMPOSITE

(Average of No. 1 heavy melting steel scrap prices, per gross ton, at Pittsburgh, Chicago, eastern Pennsylvania.)

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Avg
1960.....	$41.92	$38.87	$34.00	$33.67	$33.07	$31.33	$31.63	$32.33	$32.00	$30.04	$28.83	$28.92	$33.05
1959.....	40.58	42.58	40.40	34.96	33.58	36.07	38.45	38.64	41.25	44.00	44.33	41.71	39.71
1958.....	34.10	37.33	35.82	33.08	33.21	35.50	37.54	41.58	42.87	42.25	41.42	39.47	37.85
1957.....	58.96	53.41	49.63	43.57	45.75	54.89	54.67	53.33	47.73	37.37	33.17	32.77	47.10
1956.....	52.17	48.96	50.21	54.90	50.34	46.04	47.70	57.13	59.08	57.27	61.83	64.29	54.16
1955.....	34.95	36.79	37.50	36.73	34.87	35.44	39.67	43.97	44.42	45.17	46.08	50.37	40.50
1954.....	29.05	26.91	24.37	25.67	28.00	27.92	27.42	28.80	29.94	32.25	33.33	32.58	28.85
1953.....	43.00	43.00	44.05	42.88	39.17	40.50	43.51	43.40	36.93	32.75	35.00	32.10	39.69
1952.....	43.00	43.00	43.00	43.00	43.00	42.63	42.60	43.00	43.00	43.00	43.00	43.00	42.94
1951.....	46.33	44.00	44.00	44.00	44.00	44.00	44.00	44.00	44.00	43.60	43.00	43.00	43.99
1950.....	26.93	27.52	28.23	29.40	33.82	39.25	37.04	40.00	40.93	41.37	41.33	45.50	35.94
1949.....	41.54	38.48	34.60	24.06	22.29	20.85	19.21	20.86	26.07	26.71	28.96	28.03	27.64

BASIC PIG IRON PRICE COMPOSITE

(Average of basic pig iron prices, per gross ton, at Bethlehem, Pa., Birmingham, Buffalo, Chicago, Cleveland, Pittsburgh, Granite City, Ill., Youngstown.)

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Avg
1960.....	$65.99	$65.99	$65.99	$65.99	$65.99	$65.99	$65.99	$65.99	$65.99	$65.99	$65.99	$65.99	$65.99
1959.....	65.99	65.99	65.99	65.99	65.99	65.99	65.99	65.99	65.99	65.99	65.99	65.99	65.99
1958.....	65.99	65.99	65.99	65.99	65.99	65.99	65.99	65.99	65.99	65.99	65.99	65.99	65.99
1957.....	62.18	62.18	64.17	64.24	64.24	64.24	65.29	65.99	65.99	65.99	65.99	65.99	64.71
1956.....	58.49	58.49	56.63	59.80	59.80	59.80	59.93	62.18	62.18	62.18	62.18	62.18	60.32
1955.....	56.04	56.04	56.04	56.04	56.04	56.04	57.88	58.49	58.49	58.49	58.49	58.49	57.29
1954.....	56.04	56.04	56.04	56.04	56.04	56.04	56.04	56.04	56.04	56.04	56.04	56.04	56.04
1953.....	54.66	54.66	54.66	54.66	54.66	54.66	56.03	56.04	56.04	56.04	56.04	56.04	55.35
1952.....	52.16	52.16	52.16	52.16	52.16	52.16	52.66	54.66	54.66	54.66	54.66	54.66	53.24
1951.....	52.16	52.16	52.16	52.16	52.16	52.16	52.16	52.16	52.16	52.16	52.16	52.16	52.16
1950.....	45.70	45.97	45.97	45.97	45.97	45.97	45.97	45.97	47.08	47.98	49.04	52.16	46.98

MALLEABLE PIG IRON PRICE COMPOSITE

(Average of malleable pig iron prices, per gross ton, at Bethlehem, Pa., Buffalo, Chicago, Cleveland, Pittsburgh, Granite City, Ill., Youngstown.)

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Avg
1960.....	$67.27	$67.27	$67.27	$67.27	$67.27	$67.27	$67.27	$67.27	$67.27	$67.27	$67.27	$67.27	$67.27
1959.....	67.27	67.27	67.27	67.27	67.27	67.27	67.27	67.27	67.27	67.27	67.27	67.27	67.27
1958.....	67.27	67.27	67.27	67.27	67.27	67.27	67.27	67.27	67.27	67.27	67.27	67.27	67.27
1957.....	63.41	63.41	65.70	65.77	65.77	65.77	66.66	67.27	67.27	67.27	67.27	67.27	66.07
1956.....	59.77	59.77	59.93	61.27	61.27	61.27	61.52	63.41	63.41	63.41	63.41	63.41	61.82
1955.....	57.27	57.27	57.27	57.27	57.27	57.27	59.15	59.77	59.77	59.77	59.77	59.77	58.47
1954.....	57.27	57.27	57.27	57.27	57.27	57.27	57.27	57.27	57.27	57.27	57.27	57.27	57.27
1953.....	55.77	55.77	55.77	55.77	55.77	55.77	57.27	57.27	57.27	57.27	57.27	57.27	56.52
1952.....	53.27	53.27	53.27	53.27	53.27	53.27	53.77	55.77	55.77	55.77	55.77	55.77	54.35
1951.....	53.27	53.27	53.27	53.27	53.27	53.27	53.27	53.27	53.27	53.27	53.27	53.27	53.27
1950.....	47.27	47.27	47.27	47.27	47.27	47.27	47.33	47.49	48.15	49.46	50.27	53.27	48.30

No. 2 FOUNDRY PIG IRON PRICE COMPOSITE

(Average of No. 2 foundry pig iron prices, per gross ton, at Bethlehem, Pa., Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Pa., Granite City, Ill.)

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Avg
1960.....	$66.49	$66.49	$66.49	$66.49	$66.49	$66.49	$66.49	$66.49	$66.49	$66.49	$66.49	$66.49	$66.49
1959.....	66.49	66.49	66.49	66.49	66.49	66.49	66.49	66.49	66.49	66.49	66.49	66.49	66.49
1958.....	66.49	66.49	66.49	66.49	66.49	66.49	66.49	66.49	66.49	66.49	66.49	66.49	66.49
1957.....	62.63	62.63	64.63	64.70	64.70	64.70	65.77	66.49	66.49	66.49	66.49	66.49	65.18
1956.....	58.99	58.99	59.15	60.27	60.27	60.27	60.95	62.63	62.63	62.63	62.63	62.63	61.00
1955.....	56.54	56.54	56.54	56.54	56.54	56.54	58.38	58.99	58.99	58.99	58.99	58.99	57.71
1954.....	56.54	56.54	56.54	56.54	56.54	56.54	56.54	56.54	56.54	56.54	56.54	56.54	56.54
1953.....	55.04	55.04	55.04	55.04	55.04	55.04	56.54	56.54	56.54	56.54	56.54	56.54	55.79
1952.....	52.54	52.54	52.54	52.54	52.54	52.54	53.04	55.04	55.04	55.04	55.04	55.04	53.62
1951.....	52.54	52.54	52.54	52.54	52.54	52.54	52.54	52.54	52.54	52.54	52.54	52.54	52.54
1950.....	46.20	46.47	46.47	46.47	46.47	46.47	46.57	46.85	47.55	49.20	49.54	52.54	47.57
1949.....	47.39	47.34	47.34	47.31	47.27	47.27	46.08	46.10	46.10	46.10	46.10	46.10	46.28

Prices

METALWORKING FACTS AND FIGURES

AVERAGE MONTHLY QUOTATIONS IN 1960

(Unless otherwise noted, finished steel prices are cents per pound; semifinished steel, coke, and ammonium sulfate are dollars per net ton; other coal chemicals are in cents per unit stated; and pig iron and scrap in dollars per gross ton. All prices are mill or furnace, unless otherwise noted.)

PITTSBURGH	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
Structural Shapes	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50
Plates	5.30	5.30	5.30	5.30	5.30	5.30	5.30	5.30	5.30	5.30	5.30	5.30
Bars, Hot Rolled, Merchant Quality	5.675	5.675	5.675	5.675	5.675	5.675	5.675	5.675	5.675	5.675	5.675	5.675
Bars, Cold Finished	7.65	7.65	7.65	7.65	7.65	7.65	7.65	7.65	7.65	7.65	7.65	7.65
Sheets, Hot Rolled	5.10	5.10	5.10	5.10	5.10	5.10	5.10	5.10	5.10	5.10	5.10	5.10
Sheets, Cold Rolled	6.275	6.275	6.275	6.275	6.275	6.275	6.275	6.275	6.275	6.275	6.275	6.275
Sheets, Galvanized	6.875	6.875	6.875	6.875	6.875	6.875	6.875	6.875	6.875	6.875	6.875	6.875
Strip, Hot Rolled	5.10	5.10	5.10	5.10	5.10	5.10	5.10	5.10	5.10	5.10	5.10	5.10
Strip, Cold Rolled	7.425	7.425	7.425	7.425	7.425	7.425	7.425	7.425	7.425	7.425	7.425	7.425
Standard Spikes	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10
Plain Wire	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
Wire Nails	8.95	8.95	8.95	8.95	8.95	8.95	8.95	8.95	8.95	8.95	8.95	8.95
Structural Rivets	12.85	12.85	12.85	12.85	12.85	12.85	12.85	12.85	12.85	12.85	12.85	12.85
Steel Pipe, Buttweld, 1-3 in.; % discount from list	11.25	11.25	11.25	11.25	11.25	11.25	11.25	11.25	11.25	11.25	11.25	11.25
Tin Plate, 1.50-lb coating (base box)	$10.65	$10.65	$10.65	$10.65	$10.65	$10.65	$10.65	$10.65	$10.65	$10.65	$10.65	$10.65
Pig Iron, Bessemer, Pittsburgh district ovens	67.00	67.00	67.00	67.00	67.00	67.00	67.00	67.00	67.00	67.00	67.00	67.00
Pig Iron, Basic, Pittsburgh district ovens	66.00	66.00	66.00	66.00	66.00	66.00	66.00	66.00	66.00	66.00	66.00	66.00
Pig Iron, No. 2 Foundry, Neville Island, Pa.	66.50	66.50	66.50	66.50	66.50	66.50	66.50	66.50	66.50	66.50	66.50	66.50
Pig Iron, Malleable, Neville Island, Pa.	66.50	66.50	66.50	66.50	66.50	66.50	66.50	66.50	66.50	66.50	66.50	66.50
Blast Furnace Silvery Pig Iron, 9.01-9.50% Si, Jackson, Ohio, furnace	82.50	82.50	82.50	82.50	82.50	82.50	82.50	82.50	82.50	82.50	82.50	82.50
Billets, Bessemer, and Open Hearth, Rerolling	80.00	80.00	80.00	80.00	80.00	80.00	80.00	80.00	80.00	80.00	80.00	80.00
Wire Rods (cents per pound)	6.40	6.40	6.40	6.40	6.40	6.40	6.40	6.40	6.40	6.40	6.40	6.40
Coke, Furnace, Behive, spot, Connellsville, Pa.	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
Coke, Foundry, Beehive, spot, Connellsville, Pa.	18.25	18.25	18.25	18.25	18.25	18.25	18.25	18.25	18.25	18.25	18.25	18.25
Scrap, No. 1 Heavy Melting Steel	42.25	39.50	34.50	34.50	32.90	30.50	30.50	30.90	30.50	28.50	26.50	26.50
Scrap, Low Phos. (Punchings and Plate)	54.50	52.10	46.50	45.50	43.70	40.50	39.25	39.50	39.50	36.25	34.50	34.50
Scrap No. 1 Cupola	50.50	50.50	47.25	43.25	43.70	40.00	38.50	38.50	38.50	37.00	34.50	34.50

CHICAGO	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
Bars, Hot Rolled, Merchant Quality	5.675	5.675	5.675	5.675	5.675	5.675	5.675	5.675	5.675	5.675	5.675	5.675
Plates	5.30	5.30	5.30	5.30	5.30	5.30	5.30	5.30	5.30	5.30	5.30	5.30
Structural Shapes	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50
Bars, Merchant, Rail Steel	5.575	5.575	5.575	5.575	5.575	5.575	5.575	5.575	5.575	5.575	5.575	5.575
Sheets, Cold Rolled	6.275	6.275	6.275	6.275	6.275	6.275	6.275	6.275	6.275	6.275	6.275	6.275
Pig Iron, No. 2 Foundry	$66.50	$66.50	$66.50	$66.50	$66.50	$66.50	$66.50	$66.50	$66.50	$66.50	$66.50	$66.50
Pig Iron, Malleable	66.50	66.50	66.50	66.50	66.50	66.50	66.50	66.50	66.50	66.50	66.50	66.50
Oven Foundry Coke, delivered from St. Paul	34.68	34.68	34.68	34.68	34.68	34.68	34.68	34.68	34.68	34.68	34.68	34.68
Scrap, No. 1 Heavy Melting Steel	41.50	37.70	31.75	31.50	31.30	29.50	30.38	31.50	30.50	28.13	26.10	26.00
Scrap, Rails for Rerolling	62.50	61.10	53.50	53.50	52.50	49.50	50.00	53.30	53.00	49.13	46.50	47.50
Scrap, No. 1 Cupola Cast	55.00	50.70	45.50	45.50	42.50	41.50	40.50	42.30	39.75	37.00	36.50	37.00

EASTERN PENNSYLVANIA	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	5.30	5.30	5.30	5.30	5.30	5.30	5.30	5.30
Structural Shapes, deld. Philadelphia	5.77	5.77	5.77	5.77	5.77	5.77	5.77	5.77	5.77	5.77	5.77	5.77
Steel Bars, deld. Philadelphia	5.975	5.975	5.975	5.975	5.975	5.975	5.975	5.975	5.975	5.975	5.98	5.98
Sheets, Hot Rolled, Sparrows Point, Md.	5.10	5.10	5.10	5.10	5.10	5.10	5.10	5.10	5.10	5.10	5.10	5.10
Pig Iron, Low Phos. (Phos. 0.075% max.)												
Pig Iron, Basic, deld. Philadelphia	$70.07	$70.07	$70.07	$70.07	$70.07	$70.07	$70.07	$70.07	$70.07	$70.07	$70.18	$70.18
Pig Iron No. 2 Foundry, deld. Philadelphia	70.57	70.57	70.57	70.57	70.57	70.57	70.57	70.57	70.57	70.57	70.68	70.68
Birdsboro, Pa.	73.00	73.00	73.00	73.00	73.00	73.00	73.00	73.00	73.00	73.00	73.00	73.00
Oven Foundry Coke, Kearny, N. J.	31.25	31.25	31.25	31.25	31.25	31.25	31.25	31.25	31.25	31.25	31.25	31.25
Scrap, No. 1 Heavy Melting Steel	42.00	39.40	35.75	35.00	35.00	34.00	34.00	34.60	35.00	34.25	34.00	34.25
Scrap, No. 1 Cupola Cast	43.50	42.00	42.00	41.00	41.00	41.00	40.00	39.00	39.00	39.00	38.00	38.00
Spiegeleisen, 19-21%, Palmerton, Pa., furnace	102.50	102.50	102.50	102.50	102.50	102.50	102.50	102.50	102.50	102.50	102.50	102.50

COAL CHEMICALS	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
Benzene, per gallon, producers' plants, tank lots	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00
Toluene, 1 degree, per gallon, deld. east of Rockies	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00
Xylene, per gallon, producers' plants, tank lots	29.00	29.00	29.00	29.00	29.00	29.00	29.00	29.00	29.00	29.00	29.00	29.00
Phenol, 90 per cent grade, per lb, producers' plants	14.75	14.75	14.75	14.75	14.75	14.75	14.75	14.75	14.75	14.75	14.75	14.75
Ammonium Sulfate, per ton, bulk, ovens	32.00	32.00	32.00	32.00	32.00	32.00	32.00	32.00	32.00	32.00	32.00	32.00

Nonferrous Prices

METALWORKING FACTS AND FIGURES

NONFERROUS METAL PRICES

(Cents per pound)

	1960 Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Yearly Averages 1960	1959	1958
Copper Sheets[1]	57.13	57.13	57.13	51.78	50.00	50.00	50.00	50.00	57.13	55.63	55.13	55.13	53.85	55.03	49.48
Copper Rods[7]	54.86	54.86	54.86	54.86	54.86	54.86	54.86	54.86	54.86	53.36	52.36	52.36	54.32	52.54	46.71
Copper Tubing[1]	58.32	58.32	58.32	58.32	58.32	58.32	58.32	58.32	58.32	56.82	56.32	56.32	57.86	55.58	49.68
Yellow Brass Sheets[1]	50.57	50.57	50.57	50.57	50.57	50.57	50.57	50.57	50.57	49.67	49.27	49.27	50.28	48.23	43.63
Yellow Brass Rods[1]	36.06	36.06	36.06	36.06	36.06	36.06	36.06	36.06	36.06	34.47	34.88	34.88	35.73	33.14	30.28
Yellow Brass Tubing[1]	54.23	54.23	54.23	54.23	54.23	54.23	54.23	54.23	54.23	53.33	53.43	53.43	54.02	51.68	46.59
Nickel Silver Sheets[2]	65.98	65.98	65.98	65.98	65.98	65.98	65.98	65.98	65.98	65.08	64.68	64.68	65.69	63.78	58.93
Phosphor Bronze Sheets[4]	77.44	77.44	77.44	77.44	77.44	77.44	77.44	77.44	77.44	76.07	75.70	75.70	77.04	75.03	68.53
Zinc Sheets[1]	27.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	27.92	26.00	24.17
Bronze Sheets[2]	56.17	56.17	56.17	56.17	56.17	56.17	56.17	56.17	56.17	54.85	54.03	54.03	55.70	53.70	48.21
Bronze Rods[2]	55.86	55.86	55.86	55.86	55.86	55.86	55.86	55.86	55.86	54.54	53.97	53.97	55.44	53.61	48.15
Bronze Tubing[2]	59.48	59.48	59.48	59.48	59.48	59.48	59.48	59.48	59.48	58.16	57.84	57.84	59.10	56.79	50.82
Yellow Brass Wire[1]	50.86	50.86	50.86	50.86	50.86	50.86	50.86	50.86	50.86	49.96	49.56	49.56	50.57	48.74	44.17
Weatherproof Copper Wire[5]	38.55	38.55	38.55	38.55	38.55	38.55	38.55	38.55	38.55	37.43	36.30	36.30	38.08	37.12	33.44
Bare Copper Wire[5]	38.35	38.35	38.35	38.35	38.35	38.35	38.35	38.35	38.35	36.85	35.35	35.35	37.73	36.47	31.58
No. 115 Brass Ingots[6]	30.75	30.75	30.75	29.25	29.25	29.25	29.25	29.25	29.25	28.75	28.25	28.25	29.42	29.89	26.71
No. 305 Brass Ingots[6]	35.25	35.25	35.25	33.75	33.75	33.75	33.75	33.75	33.75	33.25	32.75	32.75	33.92	34.18	30.86
No. 405 Brass Ingots[6]	24.75	24.75	24.75	23.75	23.75	23.75	23.75	23.75	23.75	23.63	23.50	23.50	23.95	24.39	22.19

[1]F.o.b. mill. [2]90% Cu, f.o.b. mill. [3]10% Ni, f.o.b. mill. [4]Grade A, f.o.b. mill. [5]Car lots, f.o.b. eastern mill. [6]Delivered. [7]Cold-drawn, f.o.b. mill.

COPPER

(Electrolytic; cents per pound, delivered Connecticut Valley)

	1960	1959	1958	Yearly Averages	
Jan.	34.000	29.212	25.135	1960	32.505
Feb.	34.000	30.159	24.298	1959	31.298
Mar.	33.296	32.031	24.163	1958	26.095
Apr.	33.000	32.404	24.323	1957	29.611
May	33.000	31.750	24.433	1956	42.446
June	33.000	31.490	25.400	1955	38.217
July	33.000	30.048	26.125	1954	29.777
Aug.	33.000	30.010	26.510	1953	29.037
Sept.	33.000	31.500	26.428	1952	24.500
Oct.	30.760	31.278	28.058	1951	24.500
Nov.	30.000	32.420	29.415	1950	21.588
Dec.	30.000	33.269	28.856	1949	19.499

ZINC

(Prime Western; cents per pound, East St. Louis, Ill.)

	1960	1959	1958	Yearly Averages	
Jan.	12.917	11.500	10.000	1960	12.950
Feb.	13.000	11.409	10.000	1959	11.461
Mar.	13.000	11.000	10.000	1958	10.313
Apr.	13.000	11.000	10.000	1957	11.397
May	13.000	11.000	10.000	1956	13.495
June	13.000	11.000	10.000	1955	12.303
July	13.000	11.000	10.000	1954	10.721
Aug.	13.000	11.000	10.000	1953	10.851
Sept.	13.000	11.360	10.000	1952	16.213
Oct.	13.000	12.259	10.865	1951	17.994
Nov.	13.000	12.500	11.386	1950	13.879
Dec.	12.481	12.500	11.500	1949	12.152

MAGNESIUM

(99.8% primary pig; cents per pound, f.o.b. Velasco, Tex.)

	1960	1959	1958	1957	1956
Jan.	35.250	35.250	35.250	35.250	32.500
Feb.	35.250	35.250	35.250	35.250	32.500
Mar.	35.250	35.250	35.250	35.250	32.500
Apr.	35.250	35.250	35.250	35.250	33.150
May	35.250	35.250	35.250	35.250	33.750
June	35.250	35.250	35.250	35.250	33.750
July	35.250	35.250	35.250	35.250	33.750
Aug.	35.250	35.250	35.250	35.250	34.694
Sept.	35.250	35.250	35.250	35.250	35.250
Oct.	35.250	35.250	35.250	35.250	35.250
Nov.	35.250	35.250	35.250	35.250	35.250
Dec.	35.250	35.250	35.250	35.250	35.250
Avg	35.250	35.250	35.250	35.250	33.966

ANTIMONY

(Domestic, bulk, 99.5% car lots; cents per pound, f.o.b. Laredo, Tex.)

	1960	1959	1958	Yearly Averages	
Jan.	29.000	29.000	33.000	1960	29.000
Feb.	29.000	29.000	30.250	1959	29.000
Mar.	29.000	29.000	29.000	1958	29.438
Apr.	29.000	29.000	29.000	1957	33.000
May	29.000	29.000	29.000	1956	33.000
June	29.000	29.000	29.000	1955	30.150
July	29.000	29.000	29.000	1954	28.500
Aug.	29.000	29.000	29.000	1953	33.932
Sept.	29.000	29.000	29.000	1952	42.112
Oct.	29.000	29.000	29.000	1951	42.335
Nov.	29.000	29.000	29.000	1950	27.626
Dec.	29.000	29.000	29.000	1949	36.875

ALUMINUM

(99.5% primary pig; cents per pound, f.o.b. shipping point)

	1960	1959	1958	Yearly Averages	
Jan.	26.00	24.70	26.00	1960	26.00
Feb.	26.00	24.70	26.00	1959	24.75
Mar.	26.00	24.70	26.00	1958	24.79
Apr.	26.00	24.70	24.00	1957	25.42
May	26.00	24.70	24.00	1956	24.03
June	26.00	24.70	24.00	1955	21.88
July	26.00	24.70	24.00	1954	20.20
Aug.	26.00	24.70	24.70	1953	19.70
Sept.	26.00	24.70	24.70	1952	18.40
Oct.	26.00	24.70	24.70	1951	18.00
Nov.	26.00	24.70	24.70	1950	16.70
Dec.	26.00	25.30	24.70	1949	16.00

LEAD

(Common grade; cents per pound, St. Louis)

	1960	1959	1958	Yearly Averages	
Jan.	11.800	12.415	12.800	1960	11.749
Feb.	11.800	11.368	12.800	1959	12.010
Mar.	11.800	11.238	12.800	1958	11.917
Apr.	11.800	10.992	11.800	1957	14.459
May	11.800	11.700	11.512	1956	15.813
June	11.800	11.800	11.040	1955	14.940
July	11.800	11.800	10.800	1954	13.854
Aug.	11.800	12.069	10.646	1953	13.283
Sept.	11.800	12.800	10.730	1952	16.268
Oct.	11.800	12.800	12.473	1951	17.294
Nov.	11.800	12.800	12.800	1950	13.095
Dec.	11.185	12.338	12.800	1949	15.191

COBALT

(97-99%; dollars per pound for 500 lb keg)

	1960	1959	1958	1957	1956	1955
Jan.	1.75	2.00	2.00	2.54	2.60	2.60
Feb.	1.70	1.88	2.00	2.35	2.60	2.60
Mar.	1.50	1.75	2.00	2.35	2.60	2.60
Apr.	1.50	1.75	2.00	2.35	2.60	2.60
May	1.50	1.75	2.00	2.26	2.60	2.60
June	1.50	1.75	2.00	2.00	2.60	2.60
July	1.50	1.75	2.00	2.00	2.60	2.60
Aug.	1.50	1.75	2.00	2.00	2.60	2.60
Sept.	1.50	1.75	2.00	2.00	2.60	2.60
Oct.	1.50	1.75	2.00	2.00	2.60	2.60
Nov.	1.50	1.75	2.00	2.00	2.60	2.60
Dec.	1.50	1.75	2.00	2.00	2.60	2.60
Avg	1.54	1.78	2.00	2.15	2.60	2.60

SILVER

(Open market, cents per fine ounce, New York)

	1960	1959	1958	Yearly Averages	
Jan.	91.375	90.219	89.438	1960	91.375
Feb.	91.375	90.438	88.625	1959	91.205
Mar.	91.375	91.375	88.625	1958	89.034
Apr.	91.375	91.375	88.625	1957	90.846
May	91.375	91.375	88.625	1956	90.839
June	91.375	91.375	88.625	1955	89.062
July	91.375	91.375	88.625	1954	85.250
Aug.	91.375	91.425	88.625	1953†	85.188
Sept.	91.375	91.375	88.625	1952†	84.941
Oct.	91.375	91.375	89.875	1951†	89.368
Nov.	91.375	91.375	90.125	1950†	74.165
Dec.	91.375	91.375	89.975	1949†	71.930

†As reported by Handy & Harman, New York.

NICKEL

(Electrolytic cathodes, 99.5%, base sizes, unpacked; cents per pound, f.o.b. refinery)

	1960	1959	1958	Yearly Averages	
Jan.	74.00	74.00	74.00	1960	74.00
Feb.	74.00	74.00	74.00	1959	74.00
Mar.	74.00	74.00	74.00	1958	74.00
Apr.	74.00	74.00	74.00	1957	74.00
May	74.00	74.00	74.00	1956	65.03
June	74.00	74.00	74.00	1955	64.50
July	74.00	74.00	74.00	1954	60.45
Aug.	74.00	74.00	74.00	1953	59.89
Sept.	74.00	74.00	74.00	1952	56.50
Oct.	74.00	74.00	74.00	1951	54.00
Nov.	74.00	74.00	74.00	1950	44.81
Dec.	74.00	74.00	74.00	1949	40.00

TIN

(Straits, spot; cents per pound, New York)

	1960	1959	1958	Yearly Averages	
Jan.	99.875	99.409	92.933	1960	101.556
Feb.	101.170	102.364	93.818	1959	102.004
Mar.	100.227	103.000	93.425	1958	95.086
Apr.	99.260	102.490	93.021	1957	96.317
May	99.570	103.080	94.510	1956	101.517
June	101.394	104.284	94.701	1955	94.939
July	103.565	102.298	94.950	1954	91.936
Aug.	102.815	102.333	94.995	1953	95.925
Sept.	102.355	102.440	94.120	1952	120.492
Oct.	103.445	102.231	96.500	1951	127.072
Nov.	103.359	100.985	99.034	1950	95.552
Dec.	101.631	99.130	99.019	1949	99.996

IRIDIUM

(Dollars per troy ounce)

	1960	1959	1958	1957	1956
Jan.	76.25	75.00	87.50	100.00	110.00
Feb.	74.50	75.63	80.00	105.00	106.25
Mar.	77.50	77.50	80.00	105.00	105.00
Apr.	77.50	77.50	80.00	105.00	105.00
May	77.50	77.50	76.25	105.00	105.00
June	77.50	77.50	75.00	103.75	105.00
July	72.50	77.50	75.00	100.00	105.00
Aug.	72.50	77.50	75.00	105.00	100.00
Sept.	72.50	77.50	75.00	99.40	100.00
Oct.	72.50	77.50	75.00	98.00	100.00
Nov.	72.50	77.50	75.00	95.75	100.00
Dec.	72.50	77.50	75.00	95.00	104.00
Avg	74.65	77.14	77.40	101.40	103.77

PLATINUM

(Dollars per ounce)

	1960	1959	1958	1957	1956	1955
Jan.	79.75	53.50	78.00	102.00	106.50	82.13
Feb.	83.50	58.50	75.25	98.75	104.50	81.00
Mar.	83.50	77.20	72.70	93.50	104.00	78.00
Apr.	83.50	78.50	71.13	93.50	103.90	78.00
May	83.50	78.50	67.75	93.13	105.75	77.90
June	83.50	78.50	66.40	92.25	106.50	78.13
July	83.50	78.50	64.75	90.70	106.50	81.38
Aug.	83.50	78.50	63.50	84.75	106.50	83.50
Sept.	83.50	78.50	62.25	84.00	106.00	90.63
Oct.	83.50	78.50	58.50	84.00	105.50	94.30
Nov.	83.50	78.50	57.25	84.00	105.50	102.75
Dec.	83.50	78.50	53.50	78.50	104.60	107.00
Avg	83.19	74.64	67.58	89.92	105.48	86.23

Nonferrous Metals

METALWORKING FACTS AND FIGURES

COPPER PRODUCTION, SHIPMENTS & STOCKS

(DOMESTIC STATISTICS—net tons)

Period	PRODUCTION Primary	Secondary	Refined	Deliveries to Customers*	Refined Stocks End of Period
1960	1,138,265	141,300	1,675,390	1,279,745	139,272
Jan. ..	84,098	12,286	86,491	102,829	68,550
Feb. ..	85,899	12,625	105,417	111,851	64,007
Mar. ..	107,514	9,166	131,308	126,776	61,598
Apr. ..	104,895	14,765	153,053	129,663	63,373
May ..	104,272	13,857	147,050	108,266	85,328
June ..	96,522	13,585	161,073	106,207	87,667
July ..	91,238	10,522	132,697	83,788	93,102
Aug. ..	85,579	13,836	157,382	105,417	97,379
Sept. ..	96,503	10,150	147,934	120,585	84,316
Oct. ..	102,934	10,631	151,497	93,451	113,417
Nov. ..	100,255	9,932	149,277	99,749	130,254
Dec. ..	100,456	9,642	152,211	91,163	139,272
1959	805,875	121,462	1,221,612	1,312,328	64,763
1958	1,005,179	131,294	1,446,540	1,179,416	80,722
1957	1,116,389	112,060	1,616,964	1,277,946	181,024
1956	1,133,134	139,584	1,580,387	1,465,999	120,645
1955	1,036,102	124,760	1,467,448	1,446,354	61,554
1954	863,721	102,472	1,311,631	1,208,755	47,108
1953	957,318	110,475	1,395,003	1,443,719	89,193
1952	961,886	46,063	1,189,112	1,445,834	58,858
1951	984,589	56,910	1,199,784	1,367,787	71,528

(FOREIGN STATISTICS—net tons)

Period	PRODUCTION Primary	Secondary	Refined	Deliveries to Customers	Refined Stocks End of Period
1960	2,387,153	31,052	2,021,969	2,327,021	288,510
Jan. ..	194,099	2,409	171,123	169,211	235,488
Feb. ..	185,866	1,950	164,535	168,805	238,344
Mar. .	200,054	3,032	172,195	180,796	239,192
Apr. ..	198,521	2,712	173,350	189,374	245,984
May ..	196,798	3,391	176,117	213,517	247,338
June ..	207,181	3,201	168,445	199,757	250,535
July ..	202,814	2,762	166,730	184,403	278,204
Aug. ..	209,739	2,421	172,983	213,920	285,926
Sept. ..	210,131	2,568	174,641	208,075	294,529
Oct. ..	184,436	2,482	156,901	187,081	294,735
Nov. ..	193,368	2,189	158,420	186,271	297,938
Dec. ..	204,146	1,935	166,529	225,811	288,510
1959	2,054,579	13,121	1,705,045	1,660,698	228,243
1958	1,705,242	7,402	1,364,568	1,738,988	181,822
1957	1,781,339	11,210	1,418,624	1,575,361	277,316

Total Domestic & Foreign

1960	3,525,418	172,352	3,697,359	3,606,786	427,782
1959	2,860,454	134,583	2,926,657	2,973,026	293,006
1958	2,713,412	138,696	2,811,108	2,918,404	262,544
1957	2,897,719	123,270	3,035,588	2,853,307	458,340

Copper Institute. (*)—Includes tonnages delivered from government stocks and by importers.

Imports of Copper

(Copper [excluding manufacturers] general imports, net tons)

	1960	1959	1958	1957	1956	1955
Jan.	63,674	43,860	53,182	58,502	32,195	39,307
Feb.	47,346	31,155	47,603	43,088	48,674	46,082
Mar.	52,436	37,155	48,945	55,338	44,170	45,273
Apr.	43,670	31,544	52,627	58,292	47,881	44,027
May	29,646	35,813	31,698	48,377	52,446	45,340
June	52,214	60,344	58,900	40,963	52,992	49,368
July	34,277	43,933	33,705	54,303	49,324	46,581
Aug.	54,723	38,073	29,414	47,899	58,091	55,089
Sept.	36,103	75,963	34,346	42,390	47,882	63,663
Oct.	48,082	44,298	28,194	54,741	63,686	52,500
Nov.	26,552	67,511	47,798	46,650	41,652	57,114
Dec.	32,302	79,954	40,803	47,720	60,226	58,050
Monthly Avg	43,419	49,134	42,268	49,855	49,935	50,200

U. S. Bureau of the Census.

Exports of Copper

(Ore and refined copper, net tons)

	1960	1959	1958	1957	1956	1955
Jan.	11,390	27,921	30,265	43,298	18,554	26,929
Feb.	19,838	25,034	21,056	40,981	21,659	37,375
Mar.	22,347	22,992	27,539	57,151	21,686	25,673
Apr.	32,000	24,172	27,987	50,077	18,040	27,095
May	51,031	19,201	43,482	44,775	30,303	30,233
June	40,065	16,045	25,192	47,268	17,703	19,323
July	45,067	13,580	30,326	34,519	16,172	13,819
Aug.	58,975	21,716	43,851	28,135	24,047	15,399
Sept.	44,443	8,971	36,618	29,965	27,556	22,294
Oct.	38,047	4,404	47,284	25,103	29,312	20,405
Nov.	31,003	2,540	49,577	35,689	25,165	19,340
Dec.	50,667	5,241	52,329	28,421	49,408	19,142
Monthly Avg	37,073	15,985	36,292	38,782	24,967	23,086

U. S. Bureau of the Census.

Brass Ingot Shipments

(Net tons)

	1960	1959	1958	1957
Jan.	22,695	22,046	20,468	25,681
Feb.	23,129	23,746	17,413	20,769
Mar.	23,232	26,109	18,825	21,948
Apr.	20,413	26,115	18,009	23,507
May	19,885	23,967	17,191	22,037
June	19,625	22,922	17,962	18,888
July	14,887	20,346	16,658	16,695
Aug.	20,216	21,741	17,882	19,654
Sept.	18,259	22,685	20,540	19,670
Oct.	18,948	23,067	23,225	22,800
Nov.	18,518	22,283	20,758	19,767
Dec.	15,925	19,535	18,676	16,875
Totals	235,732	274,562	227,607	248,291

Compiled by Ingot Brass & Bronze Industry, representing in excess of 95 per cent of brass and bronze industry.

Copper Consumption in U. S.

(Refined metal, net tons)

	1959	1958	1957
Brass Mills	584,100	479,510	533,954
Wire Mills	836,177	740,270	773,632
Chemical Plants	794	897	1,480
Secondary Smelters	8,111	7,182	7,876
Foundries	17,588	13,883	20,378
Miscellaneous	16,261	8,935	14,804
Totals	1,463,031	1,250,677	1,352,124

U. S. Bureau of Mines.

Copper & Brass Mill Fabricator Statistics

(Net tons)

	DELIVERIES: Deliveries to Users (actual consump.)	Producer Deliveries to Fabricators	STOCKS AT END OF PERIOD: Fabricators' Refined Stocks	Less Working Stocks	Visible Supplies	Plus Undelivered Purchases	Total Stocks and Purchases	Unfilled Orders
1960	1,237,469	1,279,745	456,094	370,055	86,039	75,222	161,261	126,260
Jan.	102,295	102,829	414,652	340,233	74,419	141,860	216,279	193,300
Feb.	103,072	111,851	423,131	343,196	79,935	132,696	212,631	165,991
Mar.	108,881	126,776	441,026	348,081	92,945	119,963	212,908	134,461
Apr.	113,619	129,663	457,070	357,711	99,359	99,814	199,173	111,082
May	107,838	108,266	457,644	360,770	96,874	85,491	182,365	117,150
June	112,223	106,207	451,982	364,301	87,681	90,527	178,208	132,070
July	75,650	83,788	459,620	372,186	87,434	87,798	175,232	126,281
Aug.	107,616	105,417	457,421	373,318	84,103	81,338	165,441	122,415
Sept.	112,828	120,585	465,178	378,677	86,501	77,877	164,378	127,346
Oct.	105,223	93,451	453,406	376,949	82,457	75,052	157,509	116,241
Nov.	107,057	99,749	446,098	369,972	76,126	68,165	144,291	116,523
Dec.	81,167	91,163	456,094	370,055	86,039	75,222	161,261	126,260
1959	1,347,526	1,312,412	414,757	340,349	74,408	130,324	204,732	202,775
Jan.	108,556	114,425	457,347	337,761	119,586	101,182	220,768	172,698
Feb.	116,565	120,134	459,046	340,522	118,524	123,321	241,845	183,113
Mar.	133,259	124,220	449,441	334,904	114,537	130,785	245,322	211,547
Apr.	120,680	135,233	463,582	337,282	126,300	125,250	251,550	204,618
May	124,060	135,135	474,657	338,835	135,822	133,694	269,516	210,424
June	132,702	150,117	492,072	343,585	148,487	111,229	259,716	191,875
July	81,500	108,127	518,699	357,474	161,225	100,367	261,592	193,338
Aug.	121,563	90,123	487,259	359,049	128,210	97,786	225,996	191,476
Sept.	116,880	92,501	462,880	360,760	102,120	111,675	213,795	206,254
Oct.	100,302	68,648	431,612	347,136	84,476	119,806	204,282	211,359
Nov.	102,837	83,626	412,401	338,856	73,545	127,162	200,707	224,442
Dec.	88,622	90,039	414,757	340,349	74,408	130,324	204,732	202,775
1958	1,166,129	1,312,412	446,358	326,438	119,920	90,401	210,321	177,869
1957	1,282,329	1,277,946	430,171	347,465	82,706	75,627	158,333	138,631
1956	1,416,378	1,465,999	437,187	336,217	100,970	117,601	218,571	183,834
1955	1,418,241	1,446,354	389,974	314,145	75,829	139,094	214,923	293,264
1954	1,231,840	1,208,755	360,526	304,619	55,907	58,125	114,032	136,581
1953	1,375,869	1,443,719	380,881	309,664	71,217	25,022	96,239	170,917
1952	1,391,477	1,445,834	331,499	292,157	39,342	32,852	71,994	275,608
1951	1,394,960	1,367,787	280,402	295,385	−14,983	32,147	17,164	303,050
1950	1,438,237	1,371,464	290,241	288,392	1,849	92,372	94,221	313,052

Copper Institute.

Nonferrous Metals

METALWORKING FACTS AND FIGURES

Slab Zinc

(Net tons)

(Commencing with January, 1948, all regularly operating U. S. primary and secondary smelters are included. Production from foreign ores is included.)

	Stock at Beginning	Production	SHIPMENTS Domestic	Export & Drawback	Gov't. Acc't.	Totals
1960	154,419	867,629	743,018	88,220	.....	831,238
Jan.	154,419	73,326	79,625	3,649	.....	83,274
Feb.	144,471	74,738	78,329	3,818	.....	82,147
Mar.	137,062	86,928	80,960	5,564	.....	86,524
Apr.	136,566	83,221	64,551	7,375	.....	71,926
May	147,861	79,216	54,790	7,249	.....	62,039
June	165,038	76,723	50,690	3,385	.....	54,075
July	187,686	73,754	50,002	4,379	.....	54,381
Aug.	207,059	63,840	64,287	5,968	.....	70,255
Sept.	200,644	60,004	58,137	10,045	.....	68,182
Oct.	192,466	63,005	58,572	6,611	.....	65,183
Nov.	190,288	60,841	56,981	11,999	.....	68,980
Dec.	182,149	72,933	46,094	18,178	.....	64,272
1959	190,237	858,020	872,867	17,971	3,000	893,838
1958	166,660	828,902	767,735	3,102	34,488	805,325
1957	68,622	1,057,450	765,127	14,970	179,446	959,563
1956	40,979	1,062,954	869,270	9,027	157,014	1,035,311
1955	124,277	1,031,018	1,007,619	19,497	87,200	1,114,316
1954	180,843	868,242	787,922	27,929	108,957	924,508
1953	87,160	971,191	818,850	16,326	42,332	877,508
1952	21,901	961,430	803,343	56,202	36,626	896,171
1951	8,884	931,833	836,800	42,067	39,949	918,816
1950	94,221	910,354	849,246	18,189	128,258	995,691
1949	20,848	870,113	648,285	56,929	91,526	796,740
1948	68,647	850,105	770,396	69,910	57,598	897,904
1947	175,800	848,027	698,281	117,305	140,230	955,816
1946	259,391	759,346	714,292	66,638	62,007	842,937
1945	237,520	799,520	762,925	9,422	5,302	777,649
1944	173,510	901,332	830,334	6,988	.....	837,322
1943	89,275	971,873	831,430	56,208	.....	887,638
1942	24,066	929,770	733,918	151,650	.....	885,568
1941	17,582	863,955	751,276	106,195	.....	857,471

American Zinc Institute Inc.

U. S. Lead

(Refiners' stocks, production, shipments; net tons)

	Stock at Beginning	Production (Inc. Secondary)	Total Supply	Domestic Shipments
1960	119,993	416,857	536,850	373,881
Jan.	119,993	40,043	160,036	42,083
Feb.	117,589	36,435	154,024	37,599
Mar.	116,269	37,192	153,461	44,076
Apr.	109,148	40,177	149,325	30,686
May	118,329	36,509	154,838	31,690
June	123,148	33,448	156,596	26,725
July	129,859	29,270	159,129	23,169
Aug.	135,858	32,623	168,481	30,001
Sept.	138,365	29,638	168,003	29,405
Oct.	138,584	33,336	171,920	30,152
Nov.	141,338	38,387	179,725	25,207
Dec.	153,895	29,799	183,694	23,088
1959	198,508	380,674	579,182	450,983
1958	91,598	522,956	614,554	380,350
1957	41,181	604,353	645,534	463,060
1956	31,089	613,293	644,382	524,848
1955	92,719	547,153	639,872	531,339
1954	81,152	551,618	632,770	475,552
1953	43,560	533,883	577,443	488,437
1952	25,339	532,778	558,117	492,094
1951	35,619	486,874	522,493	496,184
1950	70,424	571,763	642,187	499,637
1949	38,644	542,676	581,320	355,905
1948	21,328	511,356	532,684	490,630
1947	47,587	541,065	588,652	566,666
1946	44,867	396,688	441,555	393,904
1945	19,536	524,328	543,864	500,003
1944	33,090	538,618	571,708	552,063
1943	34,937	546,673	581,610	548,417
1942	20,185	633,818	654,003	618,947
1941	40,926	634,888	675,814	655,542
1940	58,777	685,480	644,257	603,143
1939	115,902	497,991	613,893	555,074
1938	129,131	408,539	537,570	421,625

American Bureau of Metal Statistics.

Mine Production of Zinc

(Net tons)

	1960	1959	1958	1957	1956
Jan.	37,343	35,830	39,020	50,174	41,082
Feb.	38,019	36,441	34,693	46,080	42,703
Mar.	42,866	37,428	36,602	51,057	47,745
Apr.	40,855	38,709	40,232	51,714	44,971
May	40,746	38,742	36,208	47,123	47,286
June	39,070	36,921	33,690	45,490	45,141
July	36,942	32,308	29,197	42,672	43,152
Aug.	33,411	31,728	29,856	42,376	45,532
Sept.	30,408	30,025	30,694	34,779	42,313
Oct.	28,201	31,608	32,738	39,350	49,600
Nov.	27,948	36,025	33,290	34,967	46,170
Dec.	35,192	39,538	35,785	34,346	46,445
Mo. Avg	35,917	35,442	34,334	43,344	45,195

U. S. Bureau of Mines.

Mine Production of Lead

(Net tons)

	1960	1959	1958	1957	1956
Jan.	20,808	23,397	25,830	30,166	26,822
Feb.	22,567	21,350	23,538	28,987	28,250
Mar.	25,528	21,015	18,126	30,867	30,950
Apr.	23,639	21,192	25,598	31,658	29,705
May	20,535	20,093	24,243	30,091	29,975
June	19,968	21,370	22,620	27,271	29,481
July	16,599	19,539	20,996	27,231	27,969
Aug.	20,222	21,648	19,455	27,718	30,630
Sept.	18,639	20,373	19,360	24,902	27,415
Oct.	18,185	20,955	20,960	28,414	31,520
Nov.	18,039	20,924	22,929	23,308	28,503
Dec.	19,213	19,856	21,865	22,880	27,109
Mo. Avg	20,329	21,299	22,110	27,791	29,402

U. S. Bureau of Mines.

Titanium

(Domestic production, net tons)

	Sponge		Mill Products
1960	5,311	1960	4,900*
1959	3,898	1959	3,211
1958	4,585	1958	2,594
1957	17,249	1957	5,658
1956	14,595	1956	5,166
1955	7,398	1955	1,898
1954	5,370	1954	1,299
1953	2,241	1953	1,114

U. S. Bureau of Mines and BDSA. *Estimated.

CONSUMPTION OF SLAB ZINC IN U. S.

(Net tons)

	Galvanizing	Brass & Bronze Products	Rolled Zinc	Die-casting	Miscellaneous	Totals
1960	355,399	97,299	35,921	321,614	50,892	861,125
Jan.	33,359	9,833	3,130	31,813	4,952	83,122
Feb.	35,001	9,529	3,250	34,529	4,756	87,365
Mar.	36,206	10,108	3,309	31,589	5,003	86,515
Apr.	31,919	7,097	3,032	24,483	4,633	71,164
May	31,503	7,697	3,402	22,957	4,956	70,515
June	31,822	8,541	3,181	25,625	4,714	73,883
July	24,735	4,610	2,118	18,895	4,879	55,237
Aug.	28,157	8,307	3,258	25,560	3,231	68,513
Sept.	26,210	8,035	2,435	26,936	3,407	67,023
Oct.	26,300	9,063	2,860	26,547	3,057	67,827
Nov.	23,287	6,887	2,965	26,698	2,881	62,718
Dec.	21,870	7,587	2,981	25,382	4,393	62,213
1959	361,027	129,278	42,949	389,331	33,612	956,197
1958	331,229	101,375	40,616	316,830	28,277	868,327
1957	367,757	112,390	41,289	376,039	38,165	935,620

CONSUMPTION OF LEAD IN U. S.—1954-60

(Net tons)

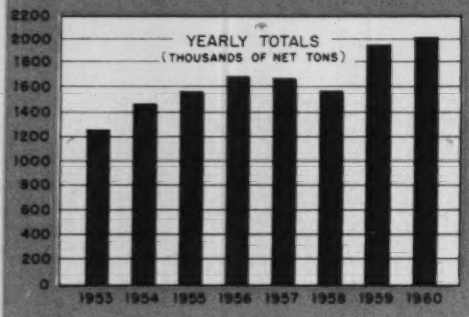
	Metal Products	Pigments	Chemicals	Miscellaneous Uses	Totals†
1960	709,086	98,120	166,262	52,782	1,026,300
Jan.	60,036	8,501	13,969	4,758	87,300
Feb.	60,550	8,924	10,771	4,545	85,100
Mar.	61,948	9,151	15,337	4,655	91,100
Apr.	56,917	8,308	13,304	4,846	83,400
May	61,468	8,529	15,904	4,920	90,800
June	62,751	8,934	11,352	4,456	87,500
July	51,383	7,177	14,469	3,761	76,800
Aug.	62,195	8,838	15,595	4,301	90,900
Sept.	59,804	7,215	15,380	4,476	86,900
Oct.	59,130	8,035	14,919	3,936	86,000
Nov.	57,728	7,460	13,984	4,140	83,300
Dec.	54,876	7,048	11,278	3,988	77,200
1959	758,252	103,671	164,505	34,721	1,091,149
1958	695,547	95,901	162,645	32,294	986,387
1957	809,963	115,341	180,557	32,234	1,138,115
1956	880,357	120,370	195,136	33,854	1,209,717
1955	875,353	131,435	170,625	35,231	1,212,644
1954	779,656	118,469	167,184	31,623	1,094,871

U. S. Bureau of Mines. †Partly estimated.

Nonferrous Metals

METALWORKING FACTS AND FIGURES

PRIMARY ALUMINUM PRODUCTION



(Net tons)

	1960	1959	1958	1957	1956	1955	1954
Jan.	164,024	156,701	139,910	147,029	140,394	128,203	116,247
Feb.	156,826	142,116	121,989	119,059	132,763	116,236	110,453
Mar.	170,688	157,189	134,019	135,706	145,895	130,272	122,330
Apr.	165,596	155,213	124,999	139,152	144,726	126,394	120,431
May	175,863	163,857	126,327	143,174	150,800	131,128	125,138
June	171,356	147,323	115,329	138,007	145,726	127,634	120,758
July	177,564	150,287	118,541	142,041	151,624	132,669	126,161
Aug.	172,973	172,617	125,416	143,449	92,406	133,551	125,296
Sept.	162,882	166,205	134,939	129,278	132,316	130,606	120,332
Oct.	167,015	173,742	139,536	133,758	149,125	134,655	125,089
Nov.	161,205	153,668	140,963	125,024	145,081	133,699	121,252
Dec.	165,504	162,996	152,301	128,036	145,381	140,745	127,035
Totals	2,014,499	1,953,019	1,565,554	1,647,714	1,679,247	1,565,785	1,460,584

Yearly totals reflect adjustments and in some instances vary slightly from the sums of monthly figures. U. S. Bureau of Mines.

Secondary Aluminum Production

(Net tons)

	From New Scrap	From Old Scrap	Total	As Metal	As Alloy†
1959	281,816	78,104	359,920	16,079	343,841
1958	225,428	64,127	289,555	7,924	281,631
1957	289,360	72,459	361,819	9,218	352,601
1956	268,095	71,673	339,768	9,471	330,297
1955	259,622	76,372	335,994	9,023	326,971
1954	232,052	59,989	292,041	5,752	286,289
1953	289,626	78,940	368,566	5,203	363,363
1952	233,258	71,264	304,522	4,897	299,625
1951	216,017	76,591	292,608	5,341	287,267
1950	167,308	76,358	243,666	2,140	241,526
1949	136,166	44,596	180,762	343	180,419
1948	191,129	95,648	286,777	2,384	284,393
1947	180,990	163,847	344,837	5,105	339,732

†Also includes chemical compounds.
U. S. Bureau of Mines.

Bauxite Production and Imports

(Gross tons. Quarterly figures are preliminary, and their sums differ slightly from final annual totals)

	—Mine Production (dried equiv.)— Arkansas	Ala., Ga., Va.	Totals	Imports as Shipped	Total New Supply
1960					
1st Qtr	472,000	9,000	481,000	2,041,000	2,522,000
2nd Qtr	691,000	19,000	710,000	2,339,000	3,049,000
3rd Qtr	371,000	17,000	388,000	2,155,000	2,543,000
1959	1,631,000	69,000	1,700,000	8,107,000	9,807,000
1st Qtr	357,000	12,000	369,000	1,976,000	2,345,000
2nd Qtr	434,000	15,000	449,000	1,906,000	2,355,000
3rd Qtr	383,000	20,000	403,000	2,081,000	2,484,000
4th Qtr	457,000	22,000	479,000	2,144,000	2,623,000
1958	1,258,000	53,000	1,311,000	7,915,000	9,226,000
1957	1,356,898	59,274	1,416,172	7,098,306	8,514,478
1956	1,668,674	74,912	1,743,586	5,669,833	7,413,419
1955	1,721,243	67,098	1,788,341	4,882,493	6,670,834
1954	1,949,368	45,528	1,994,896	4,988,122	6,983,018
1953	1,529,976	49,763	1,579,739	4,390,576	5,970,315
1952	1,603,833	63,214	1,667,047	3,497,939	5,164,986
1951	1,815,274	33,402	1,848,676	2,819,676	4,668,352
1950	1,307,335	27,192	1,334,527	2,516,247	3,850,774
1949	1,094,924	53,868	1,148,792	2,688,164	3,836,956
1948	1,395,341	61,807	1,457,148	2,488,915	3,946,063

U. S. Bureau of Mines.

Antimony Consumption

(Industrial use of primary; net tons)

PRODUCTS	1959	1958	1957	1956
Antimonial Lead & Battery Metal	4,141	3,698	4,233	5,494
Bearing Metal & Bearings	886	644	944	1,077
Cable Covering	157	208	183	190
Castings	84	82	106	57
Collapsible Tubes & Foil	33	37	20	12
Sheets & Pipe	202	273	258	300
Solder	113	100	90	144
Type Metal	883	877	607	1,050
Other Metal	130	147	165	151
Nonmetal Products	6,688	5,814	5,783	7,531
Totals	13,317	11,880	12,389	16,006

U. S. Bureau of Mines.

Antimony Production

(Domestic mine production of ores and concentrates; net tons)

Year	Gross Weight	—Antimony Content— Quantity	Average %
1959	4,671	678	14.5
1958	4,309	705	16.4
1957	3,022	709	23.5
1956	3,714	590	16.9
1955	4,011	633	16.1
1954	4,685	766	16.4

U. S. Bureau of Mines.

Aluminum Wrought Products

(Producers' shipments, thousands of pounds)

Period	Totals	Plates, Sheets, and Foil	Rolled Structural Shapes, Rods, Bars, Wire	Extruded Shapes, Blooms, and Tubing	Powder, Flake, and Paste; Forgings
1960	3,048,421	1,636,855	391,775	936,892	82,899
Jan.	249,955	131,320	32,226	78,457	7,952
Feb.	256,017	135,763	33,889	79,268	7,097
Mar.	267,149	144,060	33,202	82,584	7,303
Apr.	247,382	133,632	30,156	76,838	6,756
May	272,289	147,323	34,437	84,202	6,327
June	278,329	150,368	35,752	84,664	7,545
July	253,141	143,047	33,119	70,825	6,150
Aug.	262,036	140,272	35,025	79,685	7,054
Sept.	253,111	133,868	34,335	77,596	7,312
Oct.	246,857	128,870	30,257	81,066	6,664
Nov.	236,843	127,756	27,891	74,686	6,510
Dec.	225,312	120,576	31,486	67,021	6,229
1959	3,385,327	1,768,427	446,278	1,081,886	88,736
Jan.	236,926	124,131	35,036	71,375	6,384
Feb.	231,243	122,727	30,421	72,014	6,081
Mar.	272,867	150,730	31,978	83,128	7,031
Apr.	294,836	156,472	35,920	94,530	7,914
May	321,350	170,248	42,961	99,837	8,304
June	342,018	182,565	43,084	107,754	8,615
July	373,060	195,426	56,309	111,731	9,594
Aug.	247,610	120,457	35,422	85,201	6,530
Sept.	262,801	130,726	35,430	89,838	6,807
Oct.	287,167	144,078	38,205	97,564	7,320
Nov.	247,533	127,791	29,154	83,966	6,622
Dec.	267,916	143,076	32,358	84,948	7,534
1958	2,597,115	1,353,080	345,716	821,862	76,457

U. S. Bureau of the Census.

Antimony Imports

(Net tons)

Year	—Antimony Ore— Gross Weight	Sb Content	Needle or Liquidated Sb	Antimony Metal	Type Metal & Antimonial Lead†	Antimony Oxide
1959	15,307	6,466	163	4,395	(n.a.)	2,056
1958	12,262	5,185	17	4,672	(n.a.)	1,283
1957	21,374	8,198	38	5,052	(n.a.)	1,893
1956	17,424	6,572	46	4,693	(n.a.)	1,489
1955	16,307	7,514	46	3,671	(n.a.)	2,210

U. S. Bureau of Mines. (n.a.)—Not available. †Estimated Sb content.

Magnesium Wrought Products

(Shipments—thousands of pounds)

	1960	1959	1958	1957	1956	1955
Jan.	1,535	1,768	1,271	2,130	2,118	1,776
Feb.	1,724	1,691	1,280	2,522	1,901	1,648
Mar.	1,966	1,717	1,398	2,388	2,351	1,947
Apr.	1,790	2,089	1,479	2,510	2,279	1,756
May	1,989	1,644	1,443	2,230	2,462	1,836
June	1,742	1,945	1,709	1,881	2,302	1,678
July	1,526	1,681	1,227	1,428	2,002	1,437
Aug.	1,853	2,131	1,823	1,540	2,523	1,742
Sept.	2,288	2,288	1,807	1,501	2,031	2,158
Oct.	1,679	2,220	1,983	1,453	861	1,666
Nov.	1,582	1,326	1,660	1,230	2,141	1,954
Dec.	1,195	1,675	1,622	1,102	2,452	1,576
Totals	20,869	22,169	18,702	21,915	25,423	21,174

U. S. Bureau of the Census.

Nonferrous Metals

METALWORKING FACTS AND FIGURES

U. S. Silver Output

(Thousands of ounces; commercial bars, 0.999 fine, and other refined forms)

	From Domestic Ores†	From Foreign Ore	Totals
1960	40,141	45,678	85,819
Jan.	3,327	2,830	6,157
Feb.	3,454	3,496	6,950
Mar.	4,010	4,259	8,269
Apr.	3,866	4,158	8,024
May	3,425	4,018	7,443
June	3,278	3,924	7,202
July	2,817	3,799	6,616
Aug.	3,115	4,293	7,408
Sept.	2,415	2,872	5,287
Oct.	2,918	3,165	6,083
Nov.	3,405	4,268	7,673
Dec.	4,111	4,596	8,707
1959	23,158	32,021	55,179
1958	35,540	37,414	72,954
1957	36,279	34,932	71,211
1956	38,157	40,160	78,317
1955	37,500	40,000	77,500
1954	38,059	39,422	77,481
1953	34,697	37,764	72,461

†Includes purchases of crude silver by the U. S. Mint. American Bureau of Metal Statistics.

Magnesium Ingot Production

(Net tons)

	1960	1959	1958	1957
Jan.	3,355	1,877	5,272	7,111
Feb.	3,180	1,725	3,526	6,399
Mar.	3,600	1,925	3,235	7,175
Apr.	3,290	1,808	2,772	7,020
May	3,240	2,668	2,469	7,028
June	3,075	2,778	1,784	6,534
July	3,120	2,850	1,799	6,598
Aug.	3,200	2,967	1,845	6,958
Sept.	3,290	2,846	1,791	6,296
Oct.	3,535	3,018	1,927	6,276
Nov.	3,200	3,042	1,814	5,823
Dec.	3,985	3,529	1,862	5,648
Totals	42,775	31,033	30,096	78,865

Magnesium Association.

Uranium Concentrate

(Procurement by U. S. Atomic Energy Commission in tons of U_3O_8. Periods are fiscal years ended July 1)

	Domestic	Foreign	Totals
1960	16,567	18,015	34,582
1959	15,162	18,164	33,326
1958	10,250	16,130	26,380
1957	7,580	8,580	16,160
1956	4,200	6,240	10,440
1955	2,140	3,800	5,940
1954	1,450	3,240	4,690
1953	990	1,910	2,900
1952	830	2,830	3,660
1951	630	3,050	3,680
1950	320	2,740	3,060
1949	120	1,960	2,080
1948	110	1,960	2,070

U. S. Tin Consumption

(Gross tons)

	Consumption			
	Primary	Secondary	Totals	Stocks†
1960	52,230	28,660	80,890	33,485
Jan.	4,570	2,830	7,400	37,795
Feb.	4,760	2,520	7,280	34,640
Mar.	5,190	2,685	7,875	33,765
Apr.	4,960	2,450	7,410	32,650
May	5,310	2,395	7,705	32,325
June	5,220	2,465	7,685	31,110
July	4,655	1,865	6,520	31,105
Aug.	4,635	2,360	6,995	30,245
Sept.	3,760	2,270	6,030	31,995
Oct.	3,290	2,310	5,600	32,830
Nov.	3,935	2,440	5,475	33,390
Dec.	2,845	2,070	4,915	33,485
1959	45,500	31,730	77,230	35,510
1958	47,998	24,587	72,585	30,003

†At end of period at industrial plants. U. S. Bureau of Mines.

Nickel Production

(Net tons)

	Canada	Other Countries†	Estimated Totals
1960	213,000	57,000	270,000
1959	186,341	62,659	249,000
1958	139,559	49,122	188,681
1957	188,962	70,377	259,839
1956	178,750	52,250	231,000
1955	174,950	40,050	215,000
1954	161,250	30,750	192,000
1953	143,000	27,000	170,000
1952	140,020	23,020	163,580

†Free World. U. S. Bureau of Mines; Dominion Bureau of Statistics; STEEL.

Tungsten Concentrates

(Pounds of contained tungsten. Stocks are those held by consumers and dealers)

	Consumption	Imports for Consumption	Stocks
1960*	11,000,000	3,200,000	(n.a.)
Jan.	813,000	350,000	2,913,000
Feb.	1,266,000	645,000	2,640,000
Mar.	1,463,000	656,000	2,655,000
Apr.	1,319,000	386,000	2,096,000
May	1,135,000	349,000	1,971,000
June	927,000	430,000	2,190,000
July	626,000	70,000	2,157,000
Aug.	749,000	13,000	2,608,000
Sept.	826,000	45,000	2,834,000
Oct.	766,000	14,000	2,982,000
Nov.	777,000	145,000	3,023,000
1959	9,835,000	5,435,000	3,196,000
1958	5,320,000	6,542,000	4,670,000
1957	8,544,000	14,018,000	4,103,000
1956	9,061,000	20,860,000	2,980,000

U. S. Bureau of Mines. *Preliminary. (n.a.)—Not available.

World Tin

(Gross tons)

1960	Production	Consumption	Stocks
Jan.	13,700	15,000	69,800
Feb.	12,300	15,200	59,100
Mar.	15,200	16,200	58,200
Apr.	13,300	15,700	58,800
May	14,200	16,200	56,700
June	14,700	16,600	57,500
July	14,300	15,900	56,900
Aug.	15,700	15,600	56,600
Sept.	14,900	15,600	58,500
Oct.	13,623	14,500	58,000
1959	135,000	165,000	63,000
1958	140,000	150,000	80,400

International Tin Study Group. Figures are partly estimated and include substantial revisions from previously reported totals.

Chrome Ore

(Net tons)

	Domestic Production	Imports	New Supply	Consumption
1960	106,716	1,296,222	1,402,938	1,219,876
Jan.	8,567	101,837	110,204	143,276
Feb.	7,216	48,884	56,100	147,362
Mar.	9,339	117,415	126,745	129,773
Apr.	8,203	98,382	106,585	122,750
May	8,393	148,308	156,701	109,635
June	9,831	129,301	139,132	91,754
July	8,503	141,681	150,184	79,886
Aug.	10,796	178,473	189,269	92,278
Sept.	9,676	84,516	94,192	84,074
Oct.	8,927	109,804	118,731	77,124
Nov.	8,918	19,443	28,356	69,675
Dec.	8,556	118,178	126,736	62,249
1959	106,407	1,553,546	1,658,953	1,336,896
1958	143,795	1,263,437	1,407,232	1,220,749

U. S. Bureau of Mines.

Molybdenum Products

(Ferromolybdenum, molybdic oxide, and molybdenum salts and metal, thousands of pounds)

	Production	Shipments†	Stocks‡
1960	43,425	45,773	5,157
Jan.	3,420	4,270	5,483
Feb.	3,414	4,728	4,707
Mar.	3,948	4,007	4,929
Apr.	3,534	4,292	4,562
May	4,031	3,641	5,394
June	3,008	3,714	4,993
July	2,156	3,325	4,254
Aug.	4,109	3,849	4,889
Sept.	3,815	3,842	7,461
Oct.	4,589	3,484	5,794
Nov.	2,315	3,306	5,161
Dec.	3,083	3,293	5,157
1959	36,294	41,658	5,958
1958	30,915	31,309	5,061

†Including exports. ‡Producers'. U. S. Bureau of Mines.

Manganese

(Supplies for U. S. consumption, net tons)

	Domestic Mine Shipments	General Imports: Ore	General Imports: Ferro-manganese†	Exports: Ore	Exports: Ferro-manganese†	Net Supply
1960						
Jan.	8,300	154,530	12,766	697	398	175,000
Feb.	5,400	241,126	27,348	452	738	273,000
Mar.	7,200	241,049	16,838	588	718	264,000
Apr.	6,700	198,255	5,730	588	1,262	209,000
May	10,300	135,032	16,914	318	640	161,000
June	4,400	342,775	17,648	421	380	364,000
July	6,800	202,485	45,678	181	272	255,000
Aug.	1,300	271,228	7,172	260	302	279,000
Sept.	(n.a.)	233,970	37,434	400	354	(n.a.)
Oct.	(n.a.)	175,706	22,300	436	286	(n.a.)
Nov.	(n.a.)	185,699	14,538	479	560	(n.a.)
1959	229,174	2,397,804	204,672	5,702	4,410	2,822,000
1958	327,309	2,452,578	170,712	4,882	3,986	2,942,000
1957	366,334	3,105,172	411,446	5,267	16,256	3,861,000
1956	344,735	2,238,568	488,436	6,131	5,984	3,060,000

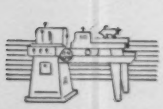
†Expressed in terms of ore. (n.a.)—Not available. U. S. Bureau of Mines.

Molybdenum Concentrates

(Pounds)

	Production	Shipments†	Consumption	Stocks
1960	68,242,000	69,946,000	44,784,000	3,481,000
Jan.	4,374,000	4,521,000	3,219,000	3,970,000
Feb.	5,653,000	6,054,000	3,797,000	3,959,000
Mar.	6,145,000	6,021,000	4,149,000	4,325,000
Apr.	6,287,000	5,900,000	3,697,000	4,742,000
May	6,149,000	6,131,000	4,287,000	4,907,000
June	6,286,000	6,897,000	5,109,000	4,282,000
July	5,445,000	4,935,000	2,315,000	4,616,000
Aug.	5,333,000	6,597,000	4,259,000	3,151,000
Sept.	5,888,000	6,435,000	3,869,000	2,973,000
Oct.	5,837,000	6,393,000	4,646,000	2,431,000
Nov.	5,517,000	4,862,000	2,343,000	3,258,000
Dec.	5,328,000	5,200,000	3,094,000	3,481,000
1959	50,956,000	51,603,000	37,448,000	4,074,000
1958	41,069,000	42,328,000	31,298,000	5,643,000

†Including exports, plus concentrates converted to oxide at Miami, Ariz., and Langeloth, Pa.
U. S. Bureau of Mines.

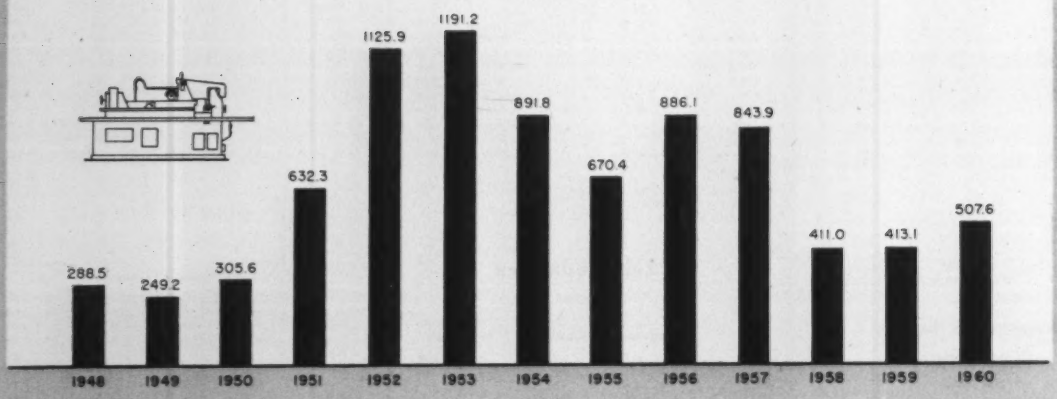


Machine Tools

METALWORKING FACTS AND FIGURES

YEARLY SHIPMENTS

(Millions of dollars)



MACHINE TOOLS—Metal Cutting Types Only

(Net new orders—value in thousands†)

	1960			1959		
	Domestic	Foreign	Totals	Domestic	Foreign	Totals
Jan.	$34,050	$9,400	$43,450	$24,850	$4,250	$29,100
Feb.	35,400	12,300	47,700	31,050	4,900	35,950
Mar.	38,550	11,900	48,450	36,050	4,200	40,250
Apr.	28,900	7,800	36,700	35,200	5,200	40,400
May	26,050	11,900	37,950	34,800	2,700	37,500
June	25,450	17,150	42,600	49,800	4,100	53,900
July	22,650	10,850	33,500	45,650	5,100	50,750
Aug.	36,300	11,500	47,800	38,750	3,500	42,250
Sept.	25,800	16,350	42,150	39,900	7,800	47,700
Oct.	25,550	10,050	35,600	35,550	8,050	43,600
Nov.	26,050	13,700	39,750	34,050	7,900	41,950
Dec.	29,450	18,000	47,450	36,650	9,000	45,650
Totals	$352,200	$150,900	$503,100	$442,300	$66,700	$509,000

†Gross orders minus cancellations.

YEARLY TOTALS

	Domestic	Foreign	Totals
1958	$232,900	$48,500	$281,400
1957	462,150	57,600	519,750
1956	828,650	95,350	924,000
1955	846,250	80,850	927,100
1954	458,150	56,300	514,450
1953	692,250	55,800	748,050
1952	748,950	53,600	802,550
1951	1,364,450	163,500	1,527,950
1950	596,500	115,950	712,450
1949	169,600	63,500	233,100

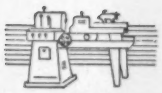
(Shipments—value in thousands)

	1960			1959		
	Domestic	Foreign	Totals	Domestic	Foreign	Totals
Jan.	$31,850	$4,900	$36,750	$20,000	$3,400	$23,400
Feb.	34,350	5,650	40,000	22,000	5,100	27,100
Mar.	44,100	6,950	51,050	32,400	5,450	37,850
Apr.	36,300	7,650	43,950	28,550	4,700	33,250
May	35,400	8,900	44,300	27,500	2,850	30,350
June	33,000	10,400	43,400	33,400	3,750	37,150
July	31,400	8,050	39,450	28,850	2,350	31,200
Aug.	29,000	7,500	36,500	27,000	4,050	31,050
Sept.	29,900	11,100	41,000	23,250	3,000	26,250
Oct.	27,750	12,900	40,650	36,550	3,650	40,200
Nov.	23,400	13,500	36,900	30,600	3,600	34,200
Dec.	33,000	15,600	48,600	45,400	5,650	51,050
Totals	$394,450	$113,100	$507,550	$365,500	$47,550	$413,050

National Machine Tool Builders' Association.

YEARLY TOTALS

	Domestic	Foreign	Totals
1958	$42,000	$5,750	$47,750
1957	753,350	90,550	843,900
1956	804,600	81,550	886,150
1955	600,000	70,400	670,400
1954	813,250	78,500	891,750
1953	1,078,050	113,150	1,191,200
1952	1,003,200	122,700	1,125,900
1951	569,000	63,250	632,250
1950	245,950	59,600	305,550
1949	186,550	62,300	249,150



Machine Tools

METALWORKING FACTS AND FIGURES

MACHINE TOOLS—Forming Types Only

(Value in thousands)

	1960						1959					
	NET NEW ORDERS			SHIPMENTS			NET NEW ORDERS			SHIPMENTS		
	Domestic	Foreign	Totals	Domestic	Foreign	Totals	Domestic	Foreign	Totals	Domestic	Foreign	Totals
Jan.	$11,000	$2,000	$13,000	$8,800	$850	$9,650	$10,250	$1,700	$11,950	$5,800	$2,100	$7,900
Feb.	11,100	1,800	12,900	10,300	1,650	11,950	9,000	450	9,450	7,850	1,100	8,950
Mar.	11,050	2,450	13,500	10,850	2,600	13,450	10,650	650	11,300	7,000	900	7,900
Apr.	11,400	3,750	15,150	8,750	2,400	11,150	11,700	1,100	12,800	9,700	2,050	11,750
May	8,350	5,650	12,000	9,350	2,700	12,050	10,750	450	11,200	8,800	1,850	10,650
June	10,300	2,200	12,500	13,000	1,700	14,700	10,300	1,200	11,500	11,550	1,350	12,900
July	5,700	3,750	9,450	10,000	1,850	11,850	7,600	5,050	12,650	8,150	1,250	9,400
Aug.	6,200	2,850	9,050	8,700	2,700	11,400	8,300	1,650	9,950	8,350	900	9,250
Sept.	6,050	4,100	10,150	10,350	2,600	12,950	10,200	950	11,150	9,000	900	9,900
Oct.	17,100	3,500	20,600	7,650	3,050	10,700	15,600	7,450	23,050	9,600	1,700	11,300
Nov.	8,400	1,800	10,200	8,900	2,750	11,650	10,050	2,250	12,300	10,500	1,900	12,400
Dec.	6,150	5,400	11,550	7,950	4,800	12,750	11,500	1,150	12,650	9,950	2,850	12,800
Totals	$110,800	$39,250	$150,050	$114,600	$29,650	$144,250	$125,900	$24,050	$149,950	$106,250	$18,850	$125,100
1958							75,050	17,850	92,900	90,200	13,700	103,900
1957							111,550	11,600	123,150	219,550	25,000	244,550

National Machine Tool Builders' Association.

METALWORKING MACHINERY

Metal Cutting Types

(Total shipments—value in thousands)

	Boring Machines	Drilling Machines	Gear Cutting Machines	Grinding, Polishing Machines	Lathes	Milling Machines	All Others	Totals
1960								
1st Qtr	$12,354	$10,620	$7,878	$28,074	$34,963	$19,813	$25,835	$139,537
2nd Qtr	12,263	11,447	8,064	29,885	35,506	20,347	26,931	144,443
3rd Qtr	10,773	8,237	7,581	30,608	29,391	18,971	20,380	125,991
1959	46,248	33,412	24,682	93,820	119,478	73,275	77,862	468,777
1958	51,563	30,023	22,661	89,367	98,679	89,315	81,326	462,934
1957	101,976	56,272	38,944	160,098	199,752	154,973	166,332	878,347
1956	101,838	65,370	49,380	172,803	217,054	115,817	169,550	891,813
1955	77,372	53,805	36,565	123,899	153,285	89,573	131,292	665,791

U. S. Bureau of the Census.

METALWORKING MACHINERY

Metal Forming Types

(Total shipments—value in thousands)

	Presses	Forging Machines	Punching, Shearing Machines	Bending, Forming Machines	All Others	Totals
1960						
1st Qtr	$26,249	$3,306	$6,788	$7,676	$10,659	$54,678
2nd Qtr	27,305	4,957	8,590	10,436	14,552	65,740
3rd Qtr	26,112	5,873	9,300	7,705	8,385	57,375
1959	84,573	17,900	29,862	35,698	42,728	210,761
1958	76,501	17,387	31,967	32,127	50,991	208,973
1957	238,774	24,714	38,315	43,860	57,582	403,245
1956	240,149	15,489	34,895	48,772	44,825	384,130
1955	170,796	15,599	28,852	35,849	44,276	295,372

U. S. Bureau of the Census.

Used Machine Tool Sales

(Index—1947-49=100)

	1960	1959	1958
January	115.0	109.5	121.1
February	129.3	148.1	121.9
March	117.8	139.3	106.3
April	137.5	132.9	105.0
May	143.2	145.7	99.5
June	137.2	131.3	111.9
July	106.0	135.3	115.9
August	135.4	139.7	93.4
September	113.3	147.8	113.6
October	126.9	145.2	128.8
November	131.2	126.8	122.3
December	113.2	123.1	135.2

YEARLY AVERAGES

1960	125.5	1955	115.1
1959	135.4	1954	99.8
1958	114.5	1953	130.1
1957	128.9	1952	147.5
1956	137.9	1951	179.4

Machinery Dealers National Association.

Machinery & Equipment

METALWORKING FACTS AND FIGURES

Industrial Trucks and Tractors

(Shipments—units)

ELECTRIC TRUCKS (Rider type)

	1960	1959	1958	1957	1956
Jan.	426	270	383	480	409
Feb.	432	206	370	385	491
Mar.	481	266	394	411	503
Apr.	484	295	373	455	503
May	496	292	325	429	520
June	523	384	277	433	533
July	502	400	353	420	512
Aug.	370	273	211	242	374
Sept.	508	386	294	302	442
Oct.	506	400	295	373	491
Nov.	463	443	238	366	501
Dec.	449	408	385	389	442
Totals	5,640	4,023	3,898	4,685	5,721

YEARLY TOTALS

1955	5,550	1953	8,992
1954	4,947	1952	7,409

HAND TRUCKS (Motorized)

1960			
Jan.	533	July	499
Feb.	532	Aug.	347
Mar	564	Sept.	465
Apr.	512	Oct.	394
May	468	Nov.	374
June	507	Dec.	342
1960	5,537	1958	5,062
1959	5,541	1957	6,581

GASOLINE POWERED TRUCKS AND TRACTORS

1960			
Jan.	1,773	July	1,523
Feb.	2,091	Aug.	1,624
Mar.	2,722	Sept.	1,867
Apr.	2,118	Oct.	1,569
May	1,968	Nov.	1,655
June	2,087	Dec.	1,628
1960	22,625	1958	16,376
1959	24,662	1957	21,110

U. S. Bureau of the Census.

Pumps

Steam, Power, Centrifugal, Rotary

(New orders—value in thousands)

	1960	1959	1958	1957
Jan.	$7,000	$4,972	$5,261	$9,601
Feb.	7,600	5,460	5,918	7,551
Mar.	7,300	5,572	6,004	7,654
Apr.	6,800	6,702	5,313	7,801
May	6,700	7,049	6,728	7,786
June	8,300	7,258	5,467	8,228
July	6,800	5,700	5,088	7,143
Aug.	....	6,200	5,663	6,982
Sept.	....	5,500	5,864	6,177
Oct.	....	5,800	5,411	6,158
Nov.	....	5,500	4,414	5,838
Dec.	....	6,600	5,200	4,906
Totals	....	$72,313	$66,331	$85,825

U. S. Bureau of the Census.

Industrial Control Apparatus

(Sales)

1960	$287,138,828	1956	$273,690,705
1959	257,360,258	1955	194,165,278
1958	230,716,620	1954	179,253,471
1957	285,345,548	1953	205,357,230

National Electrical Manufacturers Association.

Central Air Conditioning

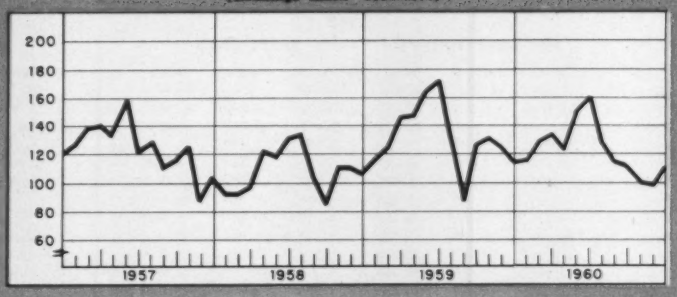
(Value of systems installed)

1959	$715,080,000	1954	$341,860,000
1958	604,130,000	1953	255,360,000
1957	604,730,000	1952	206,550,000
1956	537,410,000	1951	252,890,000
1955	390,390,000	1950	222,060,000

Air-Conditioning & Refrigeration Institute.

MATERIAL HANDLING EQUIPMENT

(Bookings index—1954=100)



	1960	1959	1958	1957	1956	1955
Jan.	114.96	115.84	93.07	126.34	112.48	91.69
Feb.	128.74	124.77	93.49	139.29	129.56	98.71
Mar.	133.60	146.36	97.89	140.76	166.14	149.16
Apr.	122.41	147.28	122.36	132.67	145.29	109.52
May	150.33	164.45	118.04	157.95	155.53	115.61
June	160.23	170.72	131.15	121.57	189.13	139.88
July	126.79	130.26	134.34	128.31	165.05	111.76
Aug.	113.59	87.02	104.48	110.09	168.70	106.24
Sept.	111.11	126.43	85.41	116.79	152.51	136.08
Oct.	99.89	131.09	111.35	124.80	143.38	123.52
Nov.	98.96	124.16	110.58	87.80	138.50	118.09
Dec.	116.60	113.78	106.97	105.65	117.76	139.85

YEARLY AVERAGES

1960	122.55	1957	134.34
1959	131.85	1956	143.66
1958	109.03	1955	120.01

Material Handling Institute Inc.

Air Conditioning, Commercial Refrigeration Equipment

(Factory shipments—units with value in thousands)

	CONDENSING UNITS		COMPRESSORS, COMPRESSOR UNITS		ICEMAKING MACHINES	
	Units	Value	Units	Value	Units	Value
1959	638,415	$72,811	4,032,721	$179,491	40,678	$22,982
1958	530,419	62,104	2,959,157	139,909	31,118	17,913
1957	554,133	69,143	2,179,910	149,203	30,596	17,384
1956	616,823	80,414	3,785,395	166,718	31,416	18,112
1955	589,335	71,067	2,554,031	116,917	31,521	16,369
1954	570,418	63,699	n.a.	127,076	n.a.	11,960
1953	966,136	74,013	2,380,739	121,054	28,228	14,385

	CENTRIFUGAL REFRIGERATION SYSTEMS		HEAT EXCHANGER EQUIPMENT		PACKAGED AIR CONDITIONING EQUIPMENT	
	Units	Value	Units	Value	Units	Value
1959	1,317	$36,194	.....	$139,703	2,079,850	$509,704
1958	1,090	32,043	.....	122,529	1,905,254	431,898
1957	1,107	34,077	.....	130,707	1,803,136	447,632
1956	921	29,105	.....	143,088	2,082,768	494,998
1955	818	25,732	.....	114,064	1,480,095	369,862
1954	556	19,868	.....	107,923	1,496,113	371,742
1953	469	14,970	.....	82,602	1,137,293	293,644

U. S. Bureau of the Census.

n.a.=not available.

Air Handling Equipment

(Shipments—value in thousands)

	Blowers and Fans		Air Washers		Unit Heaters	
Qtrs	1960	1959	1960	1959	1960	1959
1st	$35,758	$32,493	$ 811	$654	$18,014	$18,836
2nd	42,259	40,183	1,220	755	19,982	19,398
3rd	34,796	34,482	1,369	841	21,223	22,310
4th	34,120	34,031	986	570	24,534	23,734
Totals	$146,933	$141,189	$4,386	$2,820	$83,753	$84,278

U. S. Bureau of the Census.

Machinery & Equipment

METALWORKING FACTS AND FIGURES

Industrial Supplies and Machinery

(Seasonally adjusted new order index—July, 1948 = 100)

	1960	1959	1958	1957	1956	1955
January	198	186	163	221	190	160
February	200	202	157	219	190	166
March	199	221	149	210	190	171
April	194	218	148	204	195	172
May	196	218	152	199	199	177
June	197	212	164	199	197	189
July	191	216	170	197	203	182
August	190	212	172	197	211	186
September	190	207	178	203	203	196
October	182	204	187	192	206	195
November	181	202	189	180	220	194
December	176	202	190	167	218	191
Mo. Avg	191	208	168	199	202	182

American Supply & Machinery Manufacturers' Association Inc.

Screw Machine Products

(Index—1946-49 = 100)

SHIPMENTS

	1960	1959	1958	1957	1956
Jan.	220	193	165	206	216
Feb.	219	193	145	185	214
Mar.	241	214	141	197	215
Apr.	205	219	141	193	199
May	195	201	134	192	191
June	207	218	133	173	178
July	143	194	124	139	137
Aug.	188	205	142	173	172
Sept.	186	217	151	168	164
Oct.	185	243	184	184	202
Nov.	168	208	158	159	180
Dec.	161	225	175	144	167

Yearly Averages

1960	193	1957	176
1959	211	1956	186
1958	149	1955	190

NEW ORDERS

	1960	1959	1958	1957	1956
Jan.	209	215	138	211	208
Feb.	207	236	137	181	207
Mar.	198	260	122	185	224
Apr.	174	234	108	183	184
May	178	219	139	167	165
June	175	239	142	166	154
July	152	192	138	159	142
Aug.	166	194	154	147	170
Sept.	166	236	161	181	143
Oct.	152	243	203	184	213
Nov.	173	201	176	135	175
Dec.	151	237	179	110	167

Yearly Averages

1960	175	1957	167
1959	226	1956	179
1958	150	1955	203

National Screw Machine Products Association.

Heat Treating

(Billings—value in thousands)

	1960	1959	1958
Jan.	$3,381.6	$2,769.1	$2,825.5
Feb.	3,585.8	2,828.0	2,466.3
Mar.	3,835.1	3,273.8	2,422.6
Apr.	3,552.6	3,316.1	2,538.0
May	3,509.4	3,302.8	2,421.5
June	3,548.4	3,512.2	2,367.3
July	2,899.7	3,302.1	2,141.5
Aug.	3,266.0	3,162.8	2,212.9
Sept.	3,281.7	3,263.8	2,456.9
Oct.	3,306.8	3,531.2	2,754.3
Nov.	3,165.5	3,092.2	2,404.8
Dec.	2,925.2	3,357.2	2,765.5

Metal Treating Institute.

Foundry Equipment Sales

(Index of net orders closed for new equipment, 1947-49 = 100)

	1960	1959	1958	1957
Jan.	95.5	127.4	57.9	117.9
Feb.	128.6	237.1	57.6	188.4
Mar.	159.9	166.6	85.9	127.0
Apr.	97.9	154.2	88.7	101.1
May	159.0	157.0	136.1	136.2
June	164.8	125.1	87.7	187.5
July	80.0	110.7	77.9	98.6
Aug.	92.4	134.1	74.1	231.3
Sept.	158.1	131.3	64.5	113.9
Oct.	81.7	140.8	118.9	145.3
Nov.	106.5	131.2	83.3	59.6
Dec.	101.2	95.9	137.0	61.4
Mo. Avg.	118.8	142.6	89.1	130.7

Foundry Equipment Manufacturers Association.

Typewriter Shipments

(Units with value in thousands)

	1960 Units	1960 Value	1959 Units	1959 Value
Jan.	68,679	$12,015	97,411	$13,761
Feb.	76,770	14,060	83,906	13,309
Mar.	93,570	16,205	92,320	14,656
Apr.	97,673	15,658	93,499	15,299
May	95,800	17,216	89,901	14,773
June	101,820	17,297	114,005	17,658
July	104,653	14,170	109,593	15,420
Aug.	99,904	15,974	114,052	16,769
Sept.	128,414	19,601	108,531	16,493
Oct.	116,234	17,665	122,089	17,922
Nov.	113,051	17,224	117,144	16,010
Dec.	94,328	15,697	140,223	18,697

YEARLY TOTALS

1960	1,190,896	$192,782	1958	1,233,313	$160,925
1959	1,282,674	190,767	1957	1,645,289	199,377

U. S. Bureau of the Census.

Office Machines

(Value, f.o.b. plant)

	Computing, Accounting Machines	Duplicating Machines	Other
1959	$829,826,000	$29,919,000	$136,741,000
1958	789,142,000	28,038,000	114,226,000
1957	605,896,000	27,362,000	137,180,000
1956	533,499,000	27,079,000	138,404,000

U. S. Bureau of the Census.

Gears

(Index—1947-49 = 100)

BOOKINGS

	1960	1959	1958	1957
Jan.	243.4	218.6	175.4	259.3
Feb.	278.6	199.9	179.1	239.5
Mar.	231.5	234.3	173.7	262.4
Apr.	249.2	255.6	153.2	221.7
May	246.9	241.9	142.2	263.2
June	269.8	274.2	173.8	215.9
July	217.5	282.6	133.3	211.4
Aug.	255.8	213.3	162.1	225.8
Sept.	197.9	243.9	170.7	174.9
Oct.	219.9	230.5	175.9	207.3
Nov.	198.9	206.7	182.7	165.3
Dec.	216.5	233.9	145.5	150.8

Yearly Averages

1960	235.5	1954	151.9
1959	234.7	1953	165.8
1958	164.0	1952	164.3
1957	216.5	1951	221.4
1956	254.4	1950	96.3
1955	199.2	1949	80.3

SHIPMENTS

	1960	1959	1958	1957
Jan.	207.3	187.7	197.4	270.4
Feb.	230.2	201.5	186.9	264.2
Mar.	244.6	222.7	200.1	269.3
Apr.	234.8	231.6	197.9	270.5
May	241.3	223.9	141.9	232.0
June	253.6	239.7	180.8	249.2
July	210.8	199.8	149.3	219.6
Aug.	217.3	204.3	161.7	219.3
Sept.	223.5	216.1	154.2	237.3
Oct.	220.6	224.1	174.3	247.8
Nov.	226.7	224.2	140.4	212.5
Dec.	220.0	250.2	167.6	200.0

Yearly Averages

1960	227.6	1954	165.2
1959	218.8	1953	201.5
1958	171.2	1952	164.3
1957	241.0	1951	158.2
1956	234.9	1950	101.2
1955	164.6	1949	89.3

American Gear Manufacturers Association.

Motors and Generators

(New orders—value in thousands)

Polyphase Induction Motors, 1-200 hp

Qtrs	1960	1959	1958
1st	$ 43,150	$ 41,090	$ 33,187
2nd	44,981	47,367	37,077
3rd	39,959	39,627	36,988
4th	35,070	41,938	36,637
Totals	$163,160	$170,022	$143,889

DC Generators & Motors, 1-200 hp

Qtrs	1960	1959	1958
1st	$ 6,267	$ 8,270	$ 4,096
2nd	5,921	7,781	5,420
3rd	4,716	7,222	5,339
4th	3,975	7,125	5,656
Totals	$20,879	$30,398	$20,511

YEARLY TOTALS

Polyphase Induction Motors, 1-200 hp		DC Generators & Motors, 1-200 hp	
1956	$222,035	1956	$47,507
1955	180,328	1955	40,210
1954	139,949	1954	32,376
1953	165,875	1953	32,133
1952	152,801	1952	40,483
1951	209,861	1951	43,318
1950	155,308	1950	28,874

National Electrical Manufacturers Assn.

Machinery & Equipment

METALWORKING FACTS AND FIGURES

Construction Machinery

(Manufacturers' shipments of selected products†)

(Value in thousands)

Total of Selected Products

1960	$977,301	1959	$1,722,710
1st Qtr	270,436	1958	1,400,215
2nd Qtr	308,684	1957	1,601,426
3rd Qtr	223,364	1956	970,142
4th Qtr	175,417	1955	726,218

Tracklaying Tractors

1960	$275,109	1959	$582,705
1st Qtr	87,260	1958	482,707
2nd Qtr	79,984	1957	306,126
3rd Qtr	59,716	1956	471,384
4th Qtr	48,149	1955	359,443

Wheel Tractors (Contractors' off-highway type)

1960	$65,233	1959	$121,225
1st Qtr	16,260	1958	120,840
2nd Qtr	23,935	1957	147,162
3rd Qtr	15,690	1956	136,216
4th Qtr	9,348	1955	64,173

Off-Highway Equipment (Haulers, trailers, and wagons)

1960	$53,511	1959	$80,131
1st Qtr	16,015	1958	44,229
2nd Qtr	17,613	1957	75,073
3rd Qtr	10,410	1956	86,932
4th Qtr	9,473	1955	48,537

Tractor Shovel Loaders (Integral types only)

1960	$103,319	1959	$283,903
1st Qtr	23,240	1958	157,889
2nd Qtr	29,827	1957	165,815
3rd Qtr	25,193	1956	n.a.
4th Qtr	25,059	1955	n.a.

Power Cranes, Draglines, and Shovels

1960	n.a.	1957	$312,032
1959	$266,686	1956	329,218
1958	216,458	1955	250,571

Mixers, Pavers, and Related Equipment

1960	$51,904	1959	$103,859
1st Qtr	13,419	1958	91,071
2nd Qtr	20,233	1957	79,785
3rd Qtr	10,629	1956	n.a.
4th Qtr	7,623	1955	n.a.

Crushing, Screening, Washing, and Combination Plants (Portable)

1960	$28,786	1959	$32,261
1st Qtr	7,304	1958	29,129
2nd Qtr	10,038	1957	26,356
3rd Qtr	6,793	1956	n.a.
4th Qtr	4,631	1955	n.a.

Ditchers, Trenchers, Scrapers, Rollers, and Compactors

1960	$77,512	1959	$104,503
1st Qtr	17,584	1958	86,683
2nd Qtr	28,146	1957	99,516
3rd Qtr	19,868	1956	n.a.
4th Qtr	11,614	1955	n.a.

Motor Graders and Light Maintenance

1960	$92,879	1959	$ 95,827
1st Qtr	25,282	1958	82,016
2nd Qtr	28,751	1957	92,802
3rd Qtr	18,863	1956	101,929
4th Qtr	19,983	1955	76,734

Construction Machinery for Mounting on Tractors

1960	$71,873	1959	$113,966
1st Qtr	9,996	1958	86,537
2nd Qtr	23,229	1957	88,207
3rd Qtr	18,661	1956	114,753
4th Qtr	14,987	1955	94,454

n.a. = not available.
†Data are not exactly comparable from quarter to quarter or year to year because of variations in the number of companies reporting and periodic changes in scope of coverage.
U. S. Bureau of the Census.

Rigid Steel Conduit and Fittings

(Shipments—thousands of feet)

	1960	1959	1958
January	42,211	34,764	34,510
February	32,463	26,789	24,773
March	20,505	25,856	26,053
April	18,508	31,654	27,549
May	23,976	35,037	30,762
June	27,717	46,100	41,033
July	24,562	39,126	32,941
August	26,815	29,926	36,383
September	28,410	20,192	40,987
October	28,707	10,248	34,318
November	23,620	13,016	30,196
December	18,274	39,063	27,468
Totals	316,068	351,771	386,973

National Electrical Manufacturers Association.

Industrial Furnaces†

(Net new orders—value)

	1960	1959	1958
Jan.	$ 6,827,000	$ 4,545,000	$ 3,048,000
Feb.	6,499,000	3,596,000	3,684,000
Mar.	9,033,000	7,842,000	2,872,000
Apr.	11,687,000	14,517,000	3,572,000
May	6,352,000	5,315,000	954,000
June	4,245,000	8,230,000	3,672,000
July	3,966,000	13,141,000	5,169,000
Aug.	7,840,000	9,738,000	3,533,000
Sept.	5,253,000	5,560,000	4,847,000
Oct.	6,634,000	12,867,000	3,105,000
Nov.	5,084,000	8,442,000	5,597,000
Dec.	3,248,000	13,437,000	4,284,000
Totals	$76,668,000	$107,230,000	$44,337,000

†Data for 1959 forward include industrial ovens.
Industrial Heating Equipment Association Inc.

Induction Heating Equipment

(Net new orders—value)

	1960	1959	1958
Jan.	$ 1,068,000	$ 1,004,000	$ 630,000
Feb.	1,248,000	1,147,000	373,000
Mar.	921,000	731,000	374,000
Apr.	1,228,000	1,268,000	435,000
May	749,000	1,128,000	501,000
June	1,081,000	2,137,000	602,000
July	645,000	1,911,000	503,000
Aug.	1,047,000	1,292,000	383,000
Sept.	627,000	1,374,000	888,000
Oct.	634,000	954,000	743,000
Nov.	1,184,000	1,577,000	586,000
Dec.	721,000	1,269,000	624,000
Totals	$11,153,000	$15,792,000	$6,642,000

Industrial Heating Equipment Association Inc.

Steel Power Boilers

(New orders, 100 sq ft or more of heating surface)

	Stationary	Marine	Totals
1959	6,361	102	6,463
1958	5,766	61	5,827
1957	n.a.	n.a.	6,765
1956	6,919	223	7,172
1955	6,310	97	6,407
1954	n.a.	n.a.	5,496
1953	5,658	35	5,693
1952	5,556	259	5,815
1951	7,171	281	7,452

Steam Generating Capacity of Water Tube Boilers

(Thousands of pounds of steam per hour at maximum continuous rating)

	Stationary	Marine	Totals
1959	123,612	12,268	135,880
1958	62,127	4,579	66,706
1957	n.a.	n.a.	141,644
1956	226,840	20,195	247,035
1955	157,295	6,825	164,120
1954	n.a.	n.a.	90,669
1953	80,634	1,629	82,263
1952	121,374	8,100	129,474
1951	194,082	15,006	209,088

n.a. = not available.
U. S. Bureau of the Census.

Machinery & Equipment

METALWORKING FACTS AND FIGURES

Bearings

(Value in thousands)

	Ball Bearings		Roller Bearings	
	Exports	Imports	Exports	Imports
1960	$19,985	$6,716	$32,839	$2,279
1959	16,728	5,124	23,784	3,901
1958	15,637	1,529	20,638	859
1957	17,697	1,174	24,203	1,621
1956	16,772	1,057	22,124	916
1955	12,175	2,346	14,963	927
1954	10,132	576	13,230	463
1953	10,164	1,089	15,034	1,307
1952	13,198	1,454	18,366	1,290

Business & Defense Services Administration.

Resistance Welding Equipment

(Value in thousands)

	1960		1959	
	Factory Shipments	Net New Orders	Factory Shipments	Net New Orders
Jan.	$1,581.5	$3,257.9	$1,426.7	$2,396.0
Feb.	2,563.2	3,732.1	1,889.5	2,457.4
Mar.	3,011.3	2,653.2	2,178.5	2,811.2
Apr.	2,942.6	2,446.3	2,192.6	2,258.2
May	2,310.1	1,870.9	2,018.9	2,407.1
June	3,266.8	2,205.0	2,755.0	2,597.2
July	2,221.0	3,243.8	2,268.5	1,980.5
Aug.	2,533.1	1,329.7	2,423.7	2,322.3
Sept.	2,558.9	1,689.2	2,112.5	2,434.6
Oct.	2,327.8	2,145.0	2,097.5	2,599.0
Nov.	1,926.9	2,457.4	1,596.7	2,130.8
Dec.	1,974.4	2,525.1	2,352.9	2,768.3

ANNUAL SHIPMENTS

1960	$29,217.6	1958	$19,780.6
1959	25,313.0	1957	31,297.5

Resistance Welder Manufacturers' Association.

Industrial Fastener Shipments

(Seasonally adjusted—1956-58=100)

	1960	1959	1958*
January	102	99	142
February	111	105	117
March	103	105	114
April	92	119	105
May	92	119	115
June	94	129	125
July	91	112	99
August	89	77	121
September	97	92	136
October	83	83	144
November	81	80	135
December	85	102	142

ANNUAL AVERAGES
(1956-58=100)

1960	94	1958	84
1959	101	1957	109

*1947-49=100.
Industrial Fasteners Institute.

Contract Stamping Shipments

(Base period—October, 1958-March, 1959)

	1960	1959	1958
Jan.	+ 1	+ 2	—13
Feb.	+ 7	+ 7	—22
Mar.	+24	+18	—24
Apr.	+ 8	+25	—25
May	+ 9	+20	—27
June	+12	—20	—24
July	—16	— 4	—33
Aug.	+ 8	+ 2	—26
Sept.	—11	+15	—22
Oct.	+ 9	+ 2	— 8
Nov.	+ 1	— 3	—24
Dec.	....	+ 2	— 5

Pressed Metal Institute.

WELDING ELECTRODES

(Shipments in pounds)

	Mild Steel	Alloy	Nonferrous	Totals
1960	399,644,232	54,594,178	1,740,233	455,978,643
1959	472,953,660	56,973,014	2,330,090	532,256,764
1958	341,620,461	43,808,308	1,153,927	386,582,696
1957	440,543,476	48,391,390	1,736,485	490,671,351
1956	471,091,044	85,997,814	2,250,929	559,348,787
1955	409,203,615	71,797,359	1,636,701	482,639,675
1954	324,260,613	52,781,433	1,340,081	378,382,127
1953	409,437,791	76,049,553	1,889,653	487,376,997
1952	425,290,499	82,633,922	1,519,208	509,443,629
1951	413,444,913	65,903,970	1,361,836	480,710,719
1950	322,954,832	42,574,710	1,861,686	367,391,228
1949	273,463,740	24,753,807	1,715,342	299,932,909
1948	369,019,831	30,214,928	2,124,496	401,359,255
1947	307,756,495	25,172,382	2,149,768	335,078,645

†Includes both alloy and nonferrous electrodes.
National Electrical Manufacturers Association.

ARCWELDING SETS

(Units ordered [1959-60] or shipped [1947-58] excluding exports)

	Single Operator, Variable Voltage, DC Sets			Transformer Welders	
	Motor Drive	Engine Drive	Generators Only	Industrial Type	Limited Input Type
1960	15,967	9,976	n.a.	46,913	
1959	15,195	8,352	332	11,639	34,437
1958	12,020	7,721	202	7,813	24,101
1957	19,981	9,995	207	11,368	15,161
1956	21,955	11,054	189	15,970	13,859
1955	17,102	9,160	280	13,965	14,041
1954	12,817	7,450	340	12,220	10,310
1953	16,362	9,673	435	13,009	10,595
1952	18,932†	11,104	227	16,794	18,489
1951	13,048†	10,333	485	15,615	16,954
1950	10,115†	8,207	272	9,652	16,674
1949	7,393†	6,193	256	7,295	12,647
1948	10,927†	10,435	385	8,792	13,690
1947	13,677†	10,582	1,169	9,719	13,034

n.a.=not available.
†Does not include rectifier type.
National Electrical Manufacturers Association.

INTERNAL COMBUSTION ENGINES

(Factory shipments)

Gasoline Engines (Except automotive, aircraft, and miniature)

	Total Engines Produced	No. Used in Own Product	Shipped to Other Firms	
			Number of Engines	Value (Thousands)
1959	7,179,565	547,726	6,505,378	$246,543
1958	5,755,879	548,958	5,124,994	204,530
1957	4,923,718	787,400	4,136,318	205,639
1956	5,883,349	833,008	5,050,341	233,735
1955	4,932,259	914,411	4,017,848	216,130
1954	3,689,505	675,930	2,993,575	179,323

Diesel Engines (Except automotive)

	Total Engines Produced	No. Used in Own Product	Shipped to Other Firms	
			Number of Engines	Value (Thousands)
1959	179,909	58,497	59,786	$189,944
1958	131,869	54,879	44,424	173,843
1957	126,961	68,828	58,133	241,310
1956	140,814	84,352	56,462	214,330
1955	139,231	78,453	60,778	191,612
1954	104,686	56,047	48,639	172,271

Gas Engines (Except automotive, aircraft, outboard, and miniature)

	Total Engines Produced	No. Used in Own Product	Shipped to Other Firms	
			Number of Engines	Value (Thousands)
1959	15,375	8,415	6,960	$47,228
1958	14,931	9,412	5,519	31,549
1957	20,882	13,475	7,407	55,561
1956	20,472	11,183	9,289	47,196
1955	18,038	10,138	7,900	34,179
1954	10,691	4,501	6,190	25,993

Outboard Motors

	Number	Value (Thousands)		Number	Value (Thousands)
1958	n.a.	$157,879	1954	479,350	$76,039
1957	549,976	138,823	1953	467,584	67,489
1956	641,527	150,388	1952	337,419	48,129
1955	514,728	101,553	1951	291,697	30,456

n.a.=not available.
U. S. Bureau of the Census.

Appliances

METALWORKING FACTS AND FIGURES

Gas Fired Boilers

(Shipments—units)

	1960	1959	1958	1957
Jan.	6,821	6,054	5,600	5,600
Feb.	8,255	6,350	5,100	5,600
Mar.	9,531	8,269	5,400	6,300
Apr.	9,862	9,746	7,400	6,300
May	9,270	9,007	7,900	7,000
June	14,202	14,766	9,700	8,500
July	11,959	15,948	11,500	10,000
Aug.	16,435	18,162	14,700	12,000
Sept.	18,600	19,787	20,300	15,400
Oct.	18,602	19,934	18,300	14,700
Nov.	11,314	12,256	10,000	8,700
Dec.	6,877	7,383	7,300	5,300
Totals	141,728	147,662	123,200	105,400

YEARLY TOTALS

1956	96,300	1953	72,000
1955	90,100	1952	68,500
1954	80,200	1951	60,500

Gas Appliance Manufacturers Association.

Domestic Heating Stoves†

(Shipments—units)

	Gas	Coal, Wood‡	Kerosine, Fuel Oil	Totals
1960	1,197,263	277,649	430,837	1,905,749
Jan.	41,505	5,405	25,110	72,020
Feb.	45,149	7,703	25,375	78,227
Mar.	70,803	13,654	28,564	113,021
Apr.	61,289	16,334	32,839	110,462
May	69,751	20,964	25,793	116,508
June	116,018	24,398	46,317	186,733
July	142,893	25,019	40,675	208,587
Aug.	167,400	36,684	49,468	253,552
Sept.	150,500	44,606	51,615	246,721
Oct.	171,597	45,051	45,430	262,078
Nov.	113,106	27,747	31,407	172,260
Dec.	47,252	10,084	28,244	85,580

YEARLY TOTALS

1959*	1,446,294	334,041	473,873	2,254,208
1958	1,484,968	310,518	466,734	2,262,220
1957	1,439,783	274,038	521,262	2,235,083
1956	1,698,978	326,805	659,572	2,685,355
1955	1,729,061	304,219	634,474	2,667,754

†Data from 1959 forward are not exactly comparable with prior data.

‡Excludes sheet metal, airtight type wood stoves.

*Monthly figures do not add up to yearly totals because of yearend revisions.

U. S. Bureau of the Census.

Floor and Wall Furnaces†

(Factory shipments—units with value in thousands)

	Floor		Wall	
	Units	Value	Units	Value
1960	94,089	$7,582	366,848	$25,341
Jan.	4,136	$341	24,194	$1,564
Feb.	4,882	401	23,477	1,492
Mar.	6,319	526	27,475	1,832
Apr.	7,092	569	28,924	1,827
May	5,456	461	28,917	1,990
June	4,839	373	28,004	1,761
July	5,069	401	29,380	1,908
Aug.	12,413	985	35,318	2,364
Sept.	15,272	1,235	39,223	2,782
Oct.	15,377	1,260	44,309	3,010
Nov.	8,905	681	31,494	2,205
Dec.	4,329	349	26,133	2,606
1959	105,802	$8,360	467,332	$28,970
Jan.	7,031	562	33,470	2,085
Feb.	5,214	410	36,484	2,117
Mar.	6,495	524	31,344	1,949
Apr.	6,661	550	36,403	2,276
May	6,407	513	33,777	1,982
June	7,149	527	35,839	2,246
July	7,848	619	38,150	2,367
Aug.	10,630	832	42,706	2,610
Sept.	16,350	1,355	45,814	3,156
Oct.	18,324	1,438	53,296	3,503
Nov.	9,807	746	44,471	2,650
Dec.	3,886	284	35,578	2,029

ANNUAL TOTALS

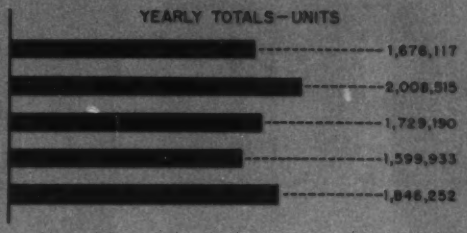
1958	114,369	$8,813	380,136	$23,493
1957	127,141	10,144	341,930	21,734
1956	167,095	13,265	324,835	21,630
1955	203,120	14,358	411,464	24,763

†Data for 1959 forward are not exactly comparable with prior data.

U. S. Bureau of the Census.

FURNACES†

(Includes floor, wall, forced air, and gravity air-flow types)



SHIPMENTS (Units with value in thousands)

	1960 Units	1960 Value	1959 Units	1959 Value
Jan.	106,607	$15,410	130,822	$18,054
Feb.	108,248	15,304	129,256	17,224
Mar.	116,601	16,181	134,223	18,770
Apr.	122,833	16,602	142,079	19,027
May	122,868	17,254	142,239	19,451
June	140,209	20,238	164,089	23,335
July	133,681	18,917	174,284	24,461
Aug.	179,698	25,992	206,666	29,489
Sept.	201,990	30,953	235,316	34,934
Oct.	199,355	29,009	246,305	34,845
Nov.	140,298	20,136	175,846	23,734
Dec.	103,729	15,348	127,390	17,182
Totals	1,676,117	$241,344	2,008,515	$280,506

YEARLY TOTALS

	Units	Value
1958	1,729,190	$256,551
1957	1,599,933	246,332
1956	1,846,252	295,539
1955	2,020,728	302,986

†Data for 1959 and forward are not exactly comparable with prior data.

U. S. Bureau of the Census.

Forced Air Furnaces†

(Shipments—units)

	Gas	Oil	Solid Fuel	Totals
1960	921,139	238,598	9,420	1,169,157
Jan.	60,531	14,877	420	75,828
Feb.	61,478	15,172	424	77,074
Mar.	65,157	14,638	395	80,190
Apr.	68,754	15,421	335	84,510
May	68,727	16,592	453	85,772
June	84,895	18,771	706	104,372
July	75,669	18,574	914	95,157
Aug.	98,328	26,283	1,383	125,994
Sept.	105,112	33,493	1,746	140,351
Oct.	100,771	31,204	1,475	133,450
Nov.	74,156	20,722	789	95,667
Dec.	57,561	12,851	380	70,792
1959*	1,041,678	327,462	13,961	1,386,101
Jan.	62,212	22,671	563	85,446
Feb.	61,503	20,863	625	82,991
Mar.	68,185	22,815	544	91,544
Apr.	72,418	21,011	479	93,908
May	73,530	23,053	540	97,123
June	87,656	26,742	942	115,340
July	92,457	28,050	1,266	121,773
Aug.	108,217	35,187	1,882	145,286
Sept.	117,509	43,533	2,436	163,478
Oct.	121,409	40,894	2,497	164,800
Nov.	87,981	25,864	1,130	114,975
Dec.	66,591	16,312	542	83,445

YEARLY TOTALS

1958	832,520	328,959	13,758	1,175,237
1957	718,113	334,594	14,947	1,067,654
1956	844,362	407,310	20,293	1,271,965
1955	824,643	464,605	17,569	1,306,817

†Data for 1959 and forward are not exactly comparable with prior data.

*Monthly figures do not add up to yearly totals because of yearend revisions.

U. S. Bureau of the Census.

Gravity Air-Flow Furnaces†

(Shipments—units)

	Gas	Oil	Solid Fuel	Totals
1960	27,576	1,878	16,569	46,023
Jan.	1,189	346	914	2,449
Feb.	1,716	132	967	2,815
Mar.	1,525	99	993	2,617
Apr.	1,489	137	681	2,307
May	1,785	77	861	2,723
June	1,738	87	1,169	2,994
July	2,476	109	1,490	4,075
Aug.	3,563	218	2,192	5,973
Sept.	4,334	202	2,608	7,144
Oct.	3,472	261	2,486	6,219
Nov.	2,634	96	1,502	4,232
Dec.	1,655	114	706	2,475
1959*	27,107	2,037	23,136	52,280
Jan.	1,916	150	1,541	3,607
Feb.	1,959	136	1,231	3,326
Mar.	2,109	119	1,233	3,461
Apr.	2,171	136	1,393	3,700
May	2,179	115	1,164	3,458
June	1,738	183	2,085	4,006
July	2,410	217	2,056	4,683
Aug.	2,609	249	3,016	5,874
Sept.	3,385	318	3,561	7,264
Oct.	4,061	265	3,135	7,461
Nov.	2,720	135	2,033	4,888
Dec.	1,662	54	1,511	3,227

YEARLY TOTALS

1958	30,526	2,455	26,467	59,448
1957	30,718	2,792	29,698	63,208
1956	39,211	4,808	38,788	82,807
1955	48,662	5,745	44,920	99,327

†Data for 1959 and forward are not exactly comparable with prior data.

*Monthly figures do not add up to yearly totals because of yearend revisions.

U. S. Bureau of the Census.

Cast Iron Radiators and Convectors†

(Shipments in thousands of square feet of radiation)

	1960	1959	1958
January	1,151	1,446	1,343
February	1,363	1,415	1,229
March	1,483	1,713	1,890
April	1,212	1,801	1,361
May	1,247	1,074	1,135
June	1,471	1,438	1,440
July	1,348	1,601	1,457
August	1,769	1,731	2,095
September	2,114	2,306	2,643
October	1,935	2,302	2,765
November	1,510	1,858	1,775
December	1,042	1,252	1,253

YEARLY TOTALS‡

1960	17,645	1957	24,892
1959	23,559	1956	29,567
1958	22,350	1955	30,863

†Data for 1959 and forward are not exactly comparable with prior data.
‡Except for 1960, monthly figures do not add up to yearly totals because of yearend revisions.
U. S. Bureau of the Census.

Plumbing Fixtures

(Shipments—value in thousands)

VITREOUS CHINA & GLAZED EARTHENWARE

Qtr	1960	1959	1958	1957
1st	$34,575	$34,673	$30,751	$32,124
2nd	39,773	38,117	30,777	34,173
3rd	34,416	41,157	32,159	34,029
4th	27,831	39,084	33,071	27,714
Totals	$136,595	$153,031	$126,758	$128,040

1956	$146,851	1954	$109,836
1955	137,677	1953	91,047

ALL METAL—EXCLUSIVE OF FITTINGS

Qtr	1960	1959	1958	1957
1st	$43,081	$48,692	$41,209	$44,663
2nd	51,887	53,895	45,464	48,154
3rd	44,374	55,371	48,750	43,985
4th	35,640	46,445	44,730	38,578
Totals	$174,982	$204,403	$180,153	$175,380

1956	$198,695	1954	$196,704
1955	225,350	1953	186,690

CAST IRON

Qtr	1960	1959	1958	1957
1st	$27,886	$31,153	$26,928	$30,040
2nd	35,077	34,684	28,983	31,803
3rd	27,577	35,132	30,757	27,197
4th	22,123	30,642	27,905	25,373
Totals	$112,663	$121,611	$114,573	$114,413

1956	$130,959	1954	$130,821
1955	148,517	1953	125,239

STEEL

Qtr	1960	1959	1958	1957
1st	$15,071	$17,412	$14,154	$14,402
2nd	16,679	19,065	16,375	16,141
3rd	16,672	20,081	17,873	16,593
4th	13,394	15,659	16,716	13,011
Totals	$61,816	$72,217	$65,118	$60,147

1956	$66,806	1954	$65,371
1955	75,996	1953	60,587

ALUMINUM, MONEL & OTHER METAL

Qtr	1960	1959	1958	1957
1st	$124	$127	$127	$221
2nd	131	146	106	210
3rd	125	158	120	195
4th	123	144	109	194
Totals	$503	$575	$462	$820

1956	$930	1954	$512
1955	837	1953	864

U. S. Bureau of the Census.

Electric Lamps (Bulbs)

(Shipments—value in thousands)

	1960	1959	1958
Jan.	$34,634	$34,373	$31,787
Feb.	43,019	35,982	30,647
Mar.	48,164	37,264	32,932
Apr.	36,591	37,715	31,295
May	34,339	33,829	25,783
June	36,180	45,235	26,880
July	32,342	41,014	26,744
Aug.	35,466	29,834	30,185
Sept.	50,361	38,462	43,863
Oct.	51,662	42,533	39,075
Nov.	40,934	43,409	36,412
Dec.	43,323	43,009	39,974
Totals	$487,015	$462,659	$395,577

YEARLY TOTALS

1957	$396,372	1955	$337,426
1956	373,230	1954	302,059

U. S. Bureau of the Census.

Metal Household Furniture

(Value of shipments—thousands)

1958	$501,147	1954	$416,172
1957	513,185	1953	355,327
1956	517,215	1952	334,804
1955	495,394	1951	345,929

U. S. Bureau of the Census.

Mattresses and Bedsprings

(Shipments—value in thousands)

	1960		1959	
	Inner Spring Mattresses	Bed-springs	Inner Spring Mattresses	Bed-springs
Jan.	$16,518	$11,740	$16,607	$12,797
Feb.	17,279	12,960	16,079	12,460
Mar.	17,400	12,922	16,558	12,544
Apr.	16,149	11,958	17,047	12,772
May	16,920	12,824	17,341	13,169
June	18,830	14,568	18,677	14,490
July	17,384	12,887	19,843	14,751
Aug.	21,879	16,257	21,609	15,670
Sept.	20,655	15,345	22,370	16,238
Oct.	18,279	13,838	20,885	15,289
Nov.	14,675	11,317	14,710	11,339
Dec.	13,291	9,755	15,668	11,389

YEARLY TOTALS

	Inner Spring Mattresses	Bedsprings	Totals
1960	$209,239	$156,371	$365,610
1959	217,394	162,908	380,302
1958	197,836	150,235	348,071
1957	194,431	144,575	339,006

U. S. Bureau of the Census.

Mechanical Stokers

(Manufacturers' sales—units)

	1959	1958	1957
Residential	12,633	12,780	12,519
Apartment, Commercial, Small Industrial	2,881	2,989	3,310
Large Industrial	249	236	294
Totals	15,763	16,005	16,123

YEARLY TOTALS

1956	17,140	1954	16,529
1955	16,754	1953	16,658

U. S. Bureau of the Census.

Gas Fired Incinerators

(Shipments—units)

	1960	1959	1958	1957
Jan.	3,300	2,800	3,600	5,200
Feb.	4,400	2,800	3,500	5,000
Mar.	4,100	3,800	4,600	4,500
Apr.	3,900	3,500	3,900	3,500
May	4,100	3,100	3,800	4,700
June	3,300	3,500	3,400	4,600
July	2,200	4,300	3,500	3,800
Aug.	3,700	4,100	4,400	4,900
Sept.	3,900	4,400	5,500	5,500
Oct.	3,400	5,100	4,500	5,700
Nov.	3,500	3,700	4,600	3,900
Dec.	2,200	2,700	6,500	2,500
Totals	42,000	43,800	51,800	53,800

Gas Appliance Manufacturers Association Inc.

Gas Fired Unit Heaters, Duct Furnaces

(Shipments—units)

	1960	1959	1958	1957
Jan.	12,800	12,100	12,100	11,800
Feb.	14,100	11,300	9,400	11,100
Mar.	14,200	11,900	10,900	12,100
Apr.	11,800	9,900	8,400	11,000
May	9,900	9,600	9,200	11,100
June	11,000	11,500	8,300	8,800
July	9,500	9,500	6,800	7,900
Aug.	13,100	14,400	10,000	12,200
Sept.	15,400	16,200	14,500	12,300
Oct.	20,500	20,900	16,300	18,200
Nov.	17,700	17,100	13,400	13,000
Dec.	15,800	16,300	14,500	10,000
Totals	165,800	160,700	133,800	139,500

Gas Appliance Manufacturers Association Inc.

Gas Conversion Burners

(Shipments—units)

	1960	1959	1958	1957
Jan.	7,100	6,700	7,300	7,300
Feb.	8,200	6,100	7,300	6,500
Mar.	8,400	6,000	6,300	8,100
Apr.	7,200	6,300	7,200	10,000
May	7,700	6,900	9,200	8,100
June	10,400	10,500	9,700	10,500
July	9,500	18,900	11,100	15,200
Aug.	16,000	20,200	18,300	23,000
Sept.	22,100	27,700	28,700	29,500
Oct.	19,300	25,300	20,600	24,700
Nov.	9,800	13,800	9,500	13,700
Dec.	6,900	7,800	6,800	6,900
Totals	132,600	156,200	142,000	163,500

YEARLY TOTALS

1956	186,900	1954	224,400
1955	209,100	1953	213,100

Gas Appliance Manufacturers Association Inc.

Oil Burners†

(Units sold separately)

	Residential	Commercial, Industrial	Totals
1960	327,022	33,185	360,207
Jan.	26,366	2,343	28,709
Feb.	26,771	2,521	29,292
Mar.	22,787	2,685	25,472
Apr.	23,467	2,374	25,841
May	23,558	2,666	26,224
June	31,444	3,350	34,794
July	19,232	2,719	21,951
Aug.	26,652	2,726	29,378
Sept.	40,330	3,256	43,586
Oct.	42,344	3 395	45,739
Nov.	25,240	2,800	28,040
Dec.	18,831	2,350	21,181

YEARLY TOTALS

1959	410,946	36,990	447,936
1958	382,415	32,243	414,658
1957	424,685	39,470	464,155
1956	531,990	39,115	571,105

†Data for 1959 and forward are not exactly comparable with prior data.
U. S. Bureau of the Census.

Appliances

METALWORKING FACTS AND FIGURES

Washer-Dryers

(Factory sales—units)

	1960	1959	1958	1957
Jan.	13,964	16,900	13,442	18,645
Feb.	16,381	20,600	12,396	20,492
Mar.	18,746	16,200	12,317	21,637
Apr.	10,404	11,100	11,847	12,665
May	9,589	11,600	7,780	9,512
June	9,812	10,400	7,069	9,019
July	8,974	9,600	7,829	10,145
Aug.	12,237	17,800	13,659	11,980
Sept.	17,824	25,500	19,806	20,158
Oct.	13,062	24,300	22,843	19,227
Nov.	9,076	15,900	17,725	13,762
Dec.	9,286	14,300	21,662	12,026
Totals	151,111*	194,200	168,375	179,268

*Total does not equal sum of monthly data because of yearend revisions.
American Home Laundry Manufacturers' Association.

Electric Freezers

(Home and farm)

(Total industry sales—units)

	1960	1959	1958
Jan.	53,200	78,800	63,000
Feb.	97,400	90,600	66,500
Mar.	112,200	121,400	75,400
Apr.	105,800	112,900	79,300
May	99,200	121,700	87,900
June	106,500	127,600	121,500
July	97,500	124,600	119,700
Aug.	112,200	108,400	101,400
Sept.	91,700	101,700	121,200
Oct.	68,500	89,600	108,100
Nov.	73,000	64,900	91,300
Dec.	66,800	63,200	65,600

YEARLY TOTALS

1960	1,084,000	1956	975,000
1959	1,205,400	1955	1,100,000
1958	1,100,900	1954	990,000
1957	925,000	1953	1,090,000

National Electrical Manufacturers Association.

Standard Vacuum Cleaners

(Sales billed—units)

	1960	1959	1958
Jan.	258,330	242,516	265,489
Feb.	294,483	271,396	225,631
Mar.	339,918	346,557	291,418
Apr.	278,391	317,402	247,293
May	265,556	257,345	218,766
June	245,790	275,974	253,127
July	223,008	221,232	263,778
Aug.	280,575	268,465	280,226
Sept.	301,935	305,096	299,618
Oct.	290,059	330,899	339,127
Nov.	280,550	290,130	293,609
Dec.	254,631	293,818	316,965

YEARLY TOTALS

1960	3,313,226	1957	3,190,172
1959	3,420,830	1956	3,721,870
1958	3,295,047	1955	3,270,441

Vacuum Cleaner Manufacturers' Association.

Coal and Wood Cooking Stoves†

(Shipments—units)

	1960	1959	1958	1957
Jan.	3,268	4,367	3,674	4,178
Feb.	3,111	3,949	3,003	4,716
Mar.	2,878	3,490	3,493	4,000
Apr.	2,986	4,039	2,764	4,716
May	3,589	2,407	2,924	4,669
June	3,382	3,871	3,648	4,757
July	3,254	3,875	3,668	3,908
Aug.	3,606	3,821	4,489	4,497
Sept.	4,401	5,194	5,659	5,451
Oct.	4,733	5,567	5,616	6,227
Nov.	4,248	n.a.	3,985	3,328
Dec.	2,513	3,025	4,159	2,350

YEARLY TOTALS‡

1960	41,969	1958	44,708	1956	58,447
1959	45,896	1957	50,281	1955	69,851

n.a. = not available.
†Data for 1959 and forward not exactly comparable with prior data.
‡Monthly figures do not add up to yearly totals because of yearend revisions.
U. S. Bureau of the Census.

Electric Dishwashers

(Total industry sales—units)

	1960	1959	1958
Jan.	37,200	35,800	30,400
Feb.	46,000	39,500	29,200
Mar.	55,100	43,800	32,900
Apr.	50,700	40,200	26,700
May	47,000	34,500	30,600
June	41,600	46,600	34,300
July	34,100	34,500	33,100
Aug.	52,300	43,900	28,400
Sept.	56,500	55,100	42,800
Oct.	41,600	50,600	38,800
Nov.	47,600	57,700	42,000
Dec.	49,800	65,100	55,500

YEARLY TOTALS

1960	559,500	1957	390,000
1959	547,300	1956	400,000
1958	424,700	1955	295,000

National Electrical Manufacturers Association.

Oil Cooking Stoves†

(Kerosine, gasoline, and fuel oil)

(Shipments—units)

	1960	1959	1958	1957
Jan.	n.a.	5,340	6,886	5,934
Feb.	n.a.	6,326	8,994	6,950
Mar.	n.a.	6,778	9,577	11,027
Apr.	5,524	6,790	4,361	6,954
May	4,404	6,536	6,527	7,849
June	4,215	6,991	5,246	5,656
July	n.a.	6,682	4,980	5,880
Aug.	n.a.	6,456	6,878	9,278
Sept.	n.a.	6,923	6,685	7,094
Oct.	n.a.	8,656	7,382	6,807
Nov.	n.a.	13,164*	6,446	6,283
Dec.	n.a.	n.a.	4,445	4,982

YEARLY TOTALS

1960	n.a.	1958	78,407	1956	88,143
1959	n.a.	1957	84,494	1955	108,257

n.a. = not available.
†Data for 1959 and forward not exactly comparable with prior data.
*Includes coal and wood cooking stoves.
U. S. Bureau of the Census.

Miscellaneous Equipment

(Manufacturers' unit sales and retail value)

Electric Toasters

(Automatic and nonautomatic)

	Units	Value
1960	3,555,000	$60,873,000
1959	3,774,000	68,000,000
1958	3,400,000	61,290,000
1957	4,000,000	71,874,000
1956	3,980,000	70,541,000

Electric Flat Irons

(Automatic, travel, and steam)

	Units	Value
1960	6,695,000	$98,559,000
1959	6,747,000	103,031,000
1958	5,550,000	86,072,000
1957	7,625,000	112,739,000
1956	8,505,000	119,074,500

Electric Ironers

	Units	Value
1960	35,000	$7,525,000
1959	40,000	8,600,000
1958	35,000	7,525,000
1957	44,000	9,592,000
1956	64,000	13,760,000

Electric Shavers

	Units	Value
1960	5,950,000	$100,852,000
1959	6,150,000	110,393,000
1958	6,400,000	124,800,000
1957	6,650,000	132,667,000
1956	6,600,000	138,600,000

Waffle Irons and Sandwich Grills

	Units	Value
1960	740,000	$14,023,000
1959	780,000	15,561,000
1958	775,000	15,460,000
1957	895,000	17,855,000
1956	980,000	19,550,000

Automatic Electric Coffeemakers

	Units	Value
1960	4,875,000	$97,256,000
1959	4,750,000	94,762,000
1958	4,200,000	79,590,000
1957	4,365,000	85,100,000
1956	5,100,000	98,685,000

Food Mixers

	Units	Value
1960	3,270,000	$73,418,000
1959	3,060,000	73,900,000
1958	2,765,000	67,322,000
1957	3,600,000	97,200,000
1956	4,245,000	119,332,000

Electric Hot Plates

	Units	Value
1960	550,000	$4,922,000
1959	625,000	6,219,000
1958	610,000	4,850,000
1957	660,000	5,247,000
1956	760,000	6,042,000

Portable Electric Heaters

CONVECTOR AND RADIANT

	Units	Value
1960	1,990,000	$65,280,000
1959	2,100,000	62,370,000
1958	1,925,000	56,830,000
1957	1,855,000	54,224,000
1956	1,903,000	56,425,000

FAN FORCED AND FAN-HEATERS

	Units	Value
1960	945,000	$21,262,000
1959	1,145,000	25,312,000
1958	985,000	21,621,000
1957	925,000	20,305,000
1956	976,000	19,032,000

Electric Fans

	Units	Value
1960	4,672,000	$167,759,000
1959	4,485,000	157,930,000
1958	4,332,000	155,533,000
1957	5,303,000	191,097,000
1956	6,865,000	259,124,000

Deep Fat Fryers

	Units	Value
1960	290,000	$4,915,000
1959	345,000	5,848,000
1958	475,000	7,576,000
1957	1,100,000	16,445,000
1956	1,450,000	22,475,000

Corn Poppers

	Units	Value
1960	730,000	$3,905,500
1959	685,000	3,665,000
1958	595,000	3,421,000
1957	550,000	2,887,000
1956	640,000	3,168,000

Electric Skillets

	Units	Value
1960	2,590,000	$46,490,500
1959	3,240,000	60,850,000
1958	3,750,000	71,062,000
1957	5,200,000	98,500,000
1956	6,100,000	109,495,000

Steel Kitchen Cabinets

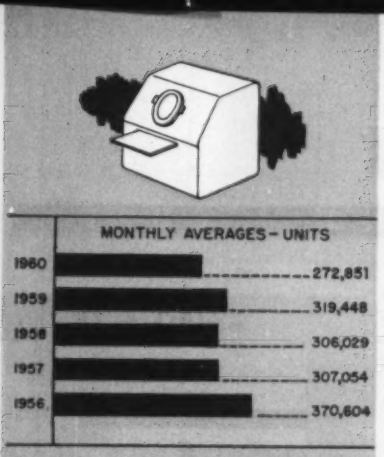
(Including steel cabinet sink units)

(Factory sales)

	Units	Value
1959	1,500,000	$ 96,000,000
1958	1,250,000	80,000,000
1957	2,490,000	150,120,000
1956	3,641,000	188,395,000
1955	4,046,000	209,328,000
1954	3,372,000	174,440,000
1953	3,441,000	178,000,000
1952	2,970,000	154,000,000

Steel Kitchen Cabinet Manufacturers Assn. Inc.

Electrical Merchandising, except where noted otherwise.



WASHERS†

(Sales billed, all types—units)

	1960	1959	1958
Jan.	251,565	288,491	244,849
Feb.	253,640	297,826	268,143
Mar.	307,613	329,668	287,884
Apr.	235,828	274,372	224,896
May	243,943	277,934	262,999
June	276,955	311,894	285,831
July	217,655	318,063	277,287
Aug.	296,499	359,849	326,785
Sept.	352,711	394,112	423,073
Oct.	305,808	374,135	401,056
Nov.	275,301	312,796	333,035
Dec.	223,531	264,236	330,520

YEARLY TOTALS

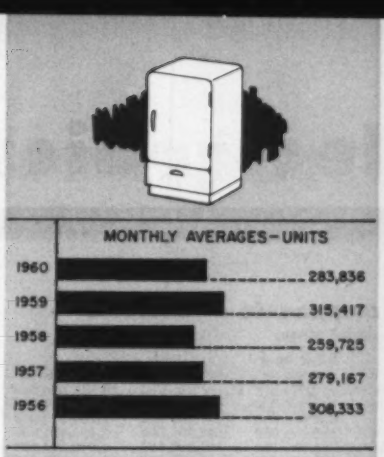
1960	3,271,211‡	1957	3,884,849
1959	3,833,376	1956*	4,447,254
1958	3,672,349	1955	4,236,555

†Domestic only, 1955-56. Domestic and export, 1957 to date.

‡Total does not equal sum of monthly data because of yearend revisions.

*Includes 102,406 washer-dryers, also reported as dryers.

American Home Laundry Manufacturers' Association.



ELECTRIC REFRIGERATORS

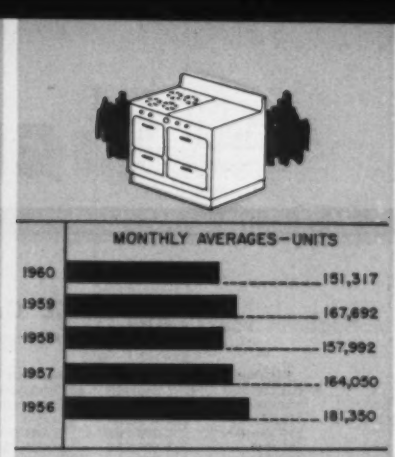
(Total industry sales—units)

	1960	1959	1958
Jan.	266,700	256,200	206,100
Feb.	302,400	306,200	227,800
Mar.	338,100	333,700	261,100
Apr.	294,000	301,000	210,800
May	268,000	308,200	262,900
June	308,500	361,000	316,300
July	291,500	370,800	279,700
Aug.	301,400	314,100	246,900
Sept.	284,900	335,700	295,200
Oct.	244,200	329,600	277,500
Nov.	253,300	265,900	245,500
Dec.	253,000	282,600	288,900

YEARLY TOTALS

1960	3,406,000	1956	3,700,000
1959	3,785,000	1955	4,200,000
1958	3,116,700	1954	3,600,000
1957	3,350,000	1953	3,650,000

National Electrical Manufacturers Association.



HOUSEHOLD GAS RANGES

(Shipments—units)

	1960	1959	1958
Jan.	133,500	148,700	128,400
Feb.	159,500	152,400	134,500
Mar.	175,000	171,300	149,200
Apr.	156,600	165,800	147,900
May	145,600	160,400	146,300
June	166,800	171,000	154,600
July	105,900	143,800	127,700
Aug.	162,800	176,400	155,700
Sept.	178,700	210,500	180,100
Oct.	169,300	195,000	209,900
Nov.	144,500	159,900	170,000
Dec.	117,800	157,100	180,100

YEARLY TOTALS

1960	1,815,800	1957	1,963,700
1959	2,012,300	1956	2,177,400
1958	1,884,400	1955	2,334,800

Gas Appliance Manufacturers Association.

Electric Clothes Dryers

(Factory sales—units)

	1960	1959	1958
Jan.	74,177	78,593	70,475
Feb.	69,898	69,422	58,630
Mar.	60,946	68,670	51,368
Apr.	35,659	43,945	27,875
May	29,465	31,318	28,515
June	42,047	47,862	34,913
July	50,264	66,791	54,557
Aug.	69,658	87,291	72,350
Sept.	106,130	115,151	110,008
Oct.	94,399	110,834	115,133
Nov.	94,271	98,786	98,972
Dec.	80,090	86,529	100,726
Totals	807,140*	905,192	823,522

*Total does not equal sum of monthly data because of yearend revisions.

American Home Laundry Manufacturers' Association.

Gas Clothes Dryers

(Factory sales—units)

	1960	1959	1958
Jan.	37,426	39,627	30,318
Feb.	38,469	36,852	21,053
Mar.	29,259	29,764	20,155
Apr.	17,554	23,807	10,600
May	24,235	14,585	13,383
June	22,903	22,976	19,260
July	22,316	28,457	20,956
Aug.	35,461	45,906	37,483
Sept.	59,378	59,409	48,725
Oct.	57,522	68,835	65,272
Nov.	47,778	58,261	43,527
Dec.	38,616	48,104	47,944
Totals	430,827*	476,583	378,676

*Total does not equal sum of monthly data because of yearend revisions.

American Home Laundry Manufacturers' Association.

Household Electric Ranges

(Total industry sales—units)

	1960	1959	1958
Jan.	115,000	120,800	109,000
Feb.	143,200	134,600	108,700
Mar.	156,400	172,600	117,900
Apr.	127,000	136,100	95,600
May	117,600	133,400	96,000
June	126,200	151,400	116,800
July	102,100	129,200	98,500
Aug.	122,400	116,600	81,400
Sept.	142,800	157,200	122,300
Oct.	127,900	143,400	135,100
Nov.	118,400	144,000	129,100
Dec.	113,500	147,500	144,000

YEARLY TOTALS

1960	1,512,500	1955	1,600,000
1959	1,686,800	1954	1,350,000
1958	1,354,400	1953	1,250,000
1957	1,365,000	1952	1,060,000
1956	1,585,000	1951	1,400,000

National Electrical Manufacturers Association.

Gas Water Heaters

(Shipments—units)

	1960	1959	1958
Jan.	215,500	266,200	235,400
Feb.	214,800	259,700	216,300
Mar.	247,300	265,900	221,600
Apr.	216,200	261,300	221,900
May	205,500	239,300	210,000
June	256,000	250,000	231,000
July	254,100	245,100	221,400
Aug.	279,400	226,100	215,500
Sept.	227,600	243,800	230,000
Oct.	191,800	274,200	265,900
Nov.	171,900	199,100	197,100
Dec.	181,400	192,900	207,300

YEARLY TOTALS

1960	2,661,500	1957	2,532,300
1959	2,953,600	1956	2,762,100
1958	2,673,400	1955	2,748,200

Gas Appliance Manufacturers Association.

Electric Water Heaters

(Total industry sales—units)

	1960	1959	1958
Jan.	48,700	62,700	61,700
Feb.	60,500	75,500	58,000
Mar.	75,100	74,900	68,600
Apr.	53,300	71,100	68,500
May	55,300	72,300	66,100
June	58,300	80,600	74,600
July	55,800	70,300	79,000
Aug.	44,400	60,000	60,800
Sept.	66,400	75,500	74,200
Oct.	51,100	65,100	78,300
Nov.	52,300	31,000	65,100
Dec.	47,300	43,900	68,600

YEARLY TOTALS

1960	668,500	1956	870,000
1959	782,900	1955	900,000
1958	823,500	1954	806,000
1957	800,000	1953	780,000

National Electrical Manufacturers Association.

Food Waste Disposers

(Plumbed-in only)

(Total industry sales—units)

	1960	1959	1958
Jan.	51,800	48,500	40,800
Feb.	56,300	59,000	46,400
Mar.	71,000	61,600	47,800
Apr.	61,200	63,200	40,000
May	64,000	53,600	46,400
June	59,300	64,500	61,300
July	52,600	63,500	49,100
Aug.	66,200	62,500	47,500
Sept.	72,800	84,200	56,200
Oct.	60,200	83,200	53,800
Nov.	60,100	67,200	59,400
Dec.	50,000	77,600	67,800

YEARLY TOTALS

1960	725,500	1956	590,000
1959	788,600	1955	520,000
1958	616,500	1954	410,000
1957	550,000	1953	325,000

National Electrical Manufacturers Association.

Electronics

METALWORKING FACTS AND FIGURES

Electronic Components

(Factory sales—selected years)

	Resistors	Capacitors	Transformers	Tubes, Semi-Conductors	All Other	Totals
1959	$ 194,000,000	$267,000,000	$129,000,000	$1,152,000,000	$1,091,000,000	$2,833,000,000
1958	158,000,000	218,000,000	102,000,000	914,000,000	933,000,000	2,325,000,000
1957	171,000,000	225,000,000	110,000,000	925,000,000	1,004,000,000	2,435,000,000
1956	175,000,000	224,000,000	98,000,000	853,000,000	938,000,000	2,288,000,000
1955	150,000,000	215,000,000	96,000,000	800,000,000	939,000,000	2,200,000,000
1954	130,000,000	200,000,000	103,000,000	708,000,000	867,000,000	2,008,000,000
1952	100,000,000	200,000,000	150,000,000	604,000,000	676,000,000	1,730,000,000
1951	n.a.	n.a.	n.a.	473,000,000	n.a.	1,261,000,000
1950	n.a.	n.a.	n.a.	443,000,000	n.a.	1,140,000,000

n.a.=not available.
Electronic Industries Association.

Industrial Electronic Equipment

(Factory Sales)

	1959	1958	1957	1956
Computing, Data Processing and Industrial Control Equipment	$525,000,000	$450,000,000	$415,000,000	$240,000,000
Testing and Measuring Equipment	245,000,000	220,000,000	210,000,000	170,000,000
Landmobile, Microwave, and Broadcast Equipment	175,000,000	155,000,000	150,000,000	120,000,000
Other Industrial Products	655,000,000	555,000,000	525,000,000	420,000,000
TOTALS	$1,600,000,000	$1,380,000,000	$1,300,000,000	$950,000,000

Electronic Industries Association.

Receiving Tubes

(Manufacturers' sales—units and value in thousands)

	1960 Units	1960 Value	1959 Units	1959 Value
Jan.	31,367	$26,872	31,150	$26,808
Feb.	32,734	27,881	33,155	28,630
Mar.	36,316	31,260	39,841	35,286
Apr.	29,737	25,759	29,800	26,047
May	30,354	25,580	30,612	25,904
June	33,916	29,045	37,421	33,099
July	34,883	28,810	36,394	29,786
Aug.	38,540	31,702	35,435	29,974
Sept.	34,612	28,007	41,989	34,594
Oct.	33,506	27,628	42,680	35,527
Nov.	30,024	25,627	37,211	31,600
Dec.	27,066	23,571	37,248	32,401
Totals	393,055	$331,751	432,936	$369,656

YEARLY TOTALS

	Units	Value
1958	397,366	$341,929
1957	456,424	384,402

Electronic Industries Association.

Television Picture Tubes

(Manufacturers' sales—units with value in thousands)

	1960 Units	1960 Value	1959 Units	1959 Value
Jan.	795,250	$15,831	784,906	$15,210
Feb.	741,233	14,496	738,336	14,085
Mar.	794,375	15,654	717,144	13,804
Apr.	707,252	13,783	696,503	13,275
May	659,859	13,330	667,080	12,746
June	756,827	15,506	766,566	15,137
July	681,785	13,898	750,352	14,648
Aug.	928,164	18,843	823,098	15,494
Sept.	913,496	18,345	913,697	18,067
Oct.	771,324	15,478	1,007,211	19,307
Nov.	732,359	14,626	840,866	16,059
Dec.	531,747	11,042	816,787	15,941
Tot.	9,013,671	$180,832	9,522,546	$183,773

YEARLY TOTALS

	Units	Value
1958	8,252,480	$163,483
1957	9,721,008	183,231

Electronic Industries Association.

Phonograph Sales

(Factory sales—units)

1960	4,523,385	1955	2,234,000
1959	4,303,617	1954	1,886,000
1958	3,212,000	1953	724,000
1957	3,718,000	1952	322,000
1956	3,338,000	1949	384,000

Electronic Industries Association.

Semiconductor Diodes and Rectifiers

(Factory sales—value in millions)

	Germanium	Silicon	All Other	Totals
1959	$31.8	$101.2	$22.3	$155.3
1958	27.6	67.8	17.4	112.8
1957	29.5	43.7	29.6	102.8
1956	19.6	30.4	26.0	76.0
1955	11.2	18.8	n.a.	n.a.
1954	8.5	11.5	n.a.	n.a.

n.a.=not available.
Electronic Industries Association.

Hi-Fi Components

(Factory sales—value in thousands)

	Receivers, Tuners	Amplifiers	Speakers	Totals
1959	$9,400	$14,200	$14,300	$37,900
1958	8,000	14,000	14,000	36,000
1957	7,900	11,200	14,400	33,500
1956	6,500	7,500	12,800	26,800
1955	n.a.	n.a.	n.a.	19,000
1954	n.a.	n.a.	n.a.	15,400
1952	n.a.	n.a.	n.a.	7,500
1950	n.a.	n.a.	n.a.	1,900

n.a.=not available.
Electronic Industries Association.

Transistor Sales

(Units and value in thousands)

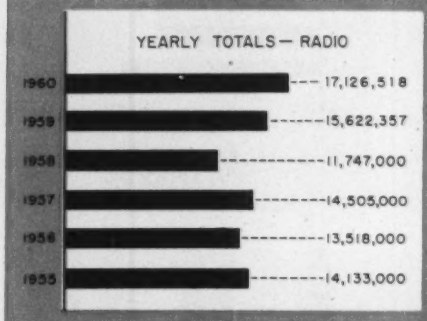
	1960 Units	1960 Value	1959 Units	1959 Value
Jan.	9,607	$24,715	5,195	$13,243
Feb.	9,528	24,831	5,393	14,550
Mar.	12,021	28,700	6,310	18,118
Apr.	9,891	23,199	5,907	16,864
May	9,046	24,146	6,358	19,007
June	10,392	27,342	6,934	18,032
July	7,071	18,084	6,030	15,618
Aug.	9,733	22,740	7,130	18,054
Sept.	12,974	28,442	8,653	20,851
Oct.	12,169	25,945	8,711	22,110
Nov.	12,149	25,372	7,847	22,743
Dec.	13,348	27,916	7,826	22,820

YEARLY TOTALS

	Units	Value
1960	127,929	$301,432
1959	82,294	222,010
1958	47,051	112,729
1957	28,738	69,739
1956	12,840	37,352

Electronic Industries Association.

RADIO & TV



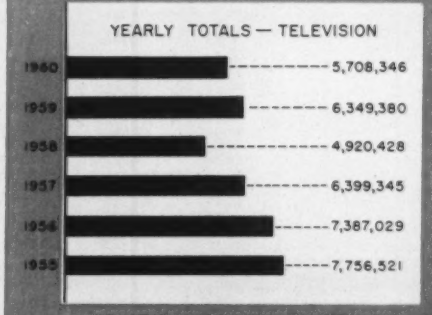
RADIO PRODUCTION

(Units)

	Automobile	Other	Totals
1960	6,432,212	10,694,306	17,126,518
January	632,461	723,327	1,355,788
February	596,872	845,496	1,442,368
March	633,761	1,033,789	1,667,550
April	389,963	830,360	1,220,323
May	483,165	813,875	1,277,040
June	596,870	954,581	1,551,451
July	326,009	562,350	890,359
August	340,560	707,546	1,048,106
September	758,961	1,156,131	1,945,092
October	639,357	1,088,203	1,727,560
November	481,026	977,521	1,458,547
December	520,097	1,000,527	1,521,734

YEARLY TOTALS

	Units	Value
1960	17,126,518	$344,154,000
1959	15,622,357	330,874,000
1958	11,747,000	314,555,000
1957	14,505,000	351,601,000
1956	13,518,000	288,474,000
1955	14,133,000	283,235,000



TELEVISION PRODUCTION

(Units)

	1960	1959	1958
January	526,494	437,026	433,963
February	503,453	459,492	370,413
March	549,500	494,032	416,903
April	422,551	389,261	302,559
May	442,176	431,911	264,982
June	515,870	571,603	377,000
July	268,654	350,346	274,980
August	462,284	547,445	507,226
September	678,937	808,337	621,734
October	499,999	706,583	495,617
November	429,757	560,770	437,772
December	405,469	603,170	414,864

YEARLY TOTALS

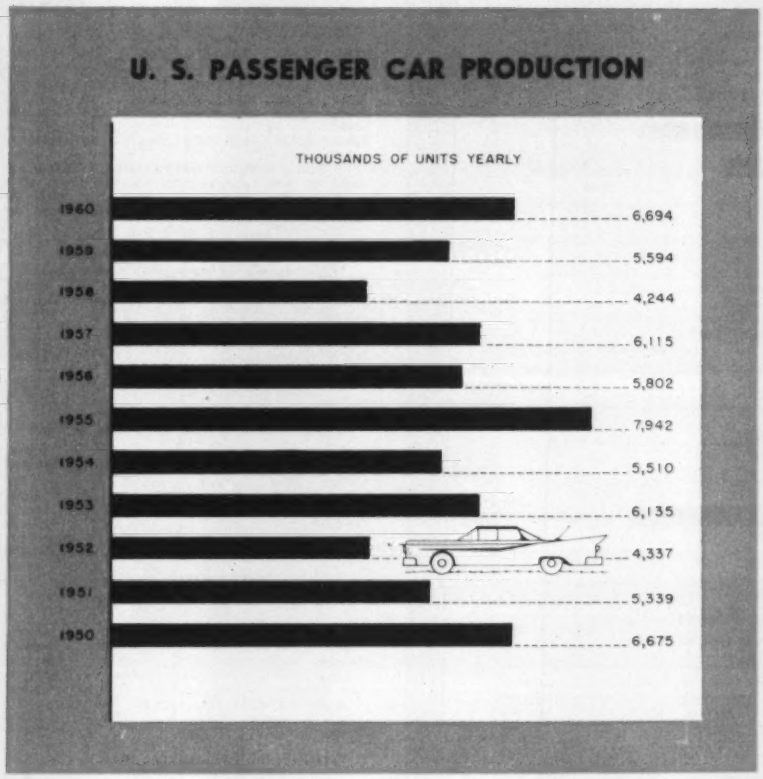
	Units	Value (Manufacturers')
1960	5,708,346	$525,300,000
1959	6,349,380	896,405,000
1958	4,920,428	667,899,000
1957	6,399,345	832,747,000
1956	7,387,029	938,596,000
1955	7,756,521	1,071,020,000

Electronic Industries Association.

Transportation

METALWORKING FACTS AND FIGURES

U. S. PASSENGER CAR PRODUCTION



Trucktrailers

(Shipments—units with value in thousands)

	—1960—		—1959—	
	Units	Value	Units	Value
Jan.	5,932	$32,910	4,607	$26,146
Feb.	6,177	33,818	4,873	27,529
Mar.	6,811	36,118	5,572	30,971
Apr.	6,238	34,447	6,110	33,003
May	5,414	30,352	6,148	32,537
June	5,414	30,259	6,491	34,435
July	4,105	23,105	5,824	32,427
Aug.	4,142	23,786	5,670	32,511
Sept.	3,923	22,045	6,168	34,116
Oct.	3,811	20,911	5,300	30,584
Nov.	3,367	19,820	5,381	30,128
Dec.	3,029	17,420	5,835	32,925

YEARLY TOTALS

	Units	Value
1960	58,363	$324,991
1959	67,979	377,312
1958	48,507	272,226
1957	57,907	304,871
1956	64,164	319,476

U. S. Bureau of the Census.

Autos, Trucks Scrapped

	Passenger Cars	Trucks, Buses	Totals
1958	4,300,000	538,000	4,838,000
1957	3,702,000	561,000	4,263,000
1956	4,327,000	621,000	4,948,000
1955	3,773,000	619,000	4,392,000
1954	3,840,000	513,000	4,353,000
1953	3,466,000	588,000	4,054,000
1952	3,163,000	604,000	3,767,000
1951	3,122,000	652,000	3,774,000
1950	2,598,000	636,000	3,234,000
1949	2,616,000	535,000	3,151,000
1948	1,780,000	495,000	2,275,000

Automobile Manufacturers Association.

Auto Imports

(Passenger cars—units)

	1960	1959	1958
Jan.	47,572	52,019	36,074
Feb.	64,329	47,126	28,547
Mar.	65,216	54,184	33,210
Apr.	54,521	55,977	34,716
May	46,166	64,553	34,262
June	33,313	60,321	28,026
July	29,356	65,241	42,285
Aug.	19,361	47,560	34,198
Sept.	20,666	51,821	33,127
Oct.	22,538	50,082	39,337
Nov.	16,985	50,493	35,929
Dec.	24,451	68,693	51,097

YEARLY TOTALS

1960	444,474	1957	259,343
1959	668,070	1956	107,675
1958	430,808	1955	57,115

Ward's Automotive Reports.

Auto Replacement Parts

(Wholesale value in thousands)

1959	$2,200,000	1947	$2,309,200
1958	2,024,900	1946	1,750,200
1957	2,008,700	1945	1,037,800
1956	1,775,600	1944	789,200
1955	1,805,500	1943	527,710
1954	1,672,500	1942	471,957
1953	1,892,400	1941	718,212
1952	2,164,300	1940	553,004
1951	2,399,400	1939	460,408
1950	1,881,700	1938	360,893
1949	1,809,900	1937	461,775
1948	2,451,500	1936	454,110

Automobile Manufacturers Association.

U. S. Auto, Truck Production

(Units)

	Passenger Cars	Trucks	Totals
1960	6,694,384	1,199,828	7,894,212
Jan.	688,731	122,478	811,209
Feb.	659,323	127,899	787,222
Mar.	654,242	129,529	783,771
Apr.	582,909	112,963	695,872
May	611,226	118,047	729,273
June	613,147	113,914	727,061
July	434,377	80,973	515,350
Aug.	305,527	64,486	370,013
Sept.	407,685	79,135	486,820
Oct.	617,816	73,754	691,570
Nov.	597,132	87,822	684,954
Dec.	522,269	88,828	611,097
1959	5,593,717	1,139,958	6,733,675
Jan.	545,766	99,547	645,313
Feb.	478,518	102,096	580,614
Mar.	576,080	111,598	687,678
Apr.	578,846	116,973	695,819
May	546,817	114,799	661,616
June	557,995	123,011	681,006
July	555,410	113,469	668,879
Aug.	239,149	56,188	295,337
Sept.	258,151	81,286	339,437
Oct.	507,527	93,023	600,550
Nov.	254,527	50,327	304,854
Dec.	494,931	77,641	572,572
1958	4,244,045	871,330	5,115,375
1957	6,115,458	1,090,200	7,205,658
1956	5,801,864	1,104,325	6,906,189
1955	7,942,132	1,246,442	9,188,574
1954	5,509,550	1,022,609	6,532,159
1953	6,134,534	1,203,835	7,338,369
1952	4,337,481	1,218,045	5,555,526
1951	5,338,820	1,412,149	6,750,969
1950	6,674,933	1,344,227	8,019,160

Ward's Automotive Reports.

Canadian Auto, Truck Production

(Units)

	Passenger Cars	Trucks	Totals
1960	325,210	70,475	395,685
Jan.	34,439	7,222	41,661
Feb.	30,408	7,181	37,589
Mar.	37,089	8,575	45,664
Apr.	34,797	7,318	42,115
May	37,772	7,806	45,578
June	34,339	7,526	41,865
July	18,985	4,833	23,818
Aug.	2,607	1,937	4,544
Sept.	12,374	4,588	16,962
Oct.	23,228	3,744	26,972
Nov.	30,265	4,536	34,801
Dec.	28,907	5,209	34,116
1959	300,825	67,523	368,348
Jan.	29,767	5,023	34,790
Feb.	32,118	5,787	37,905
Mar.	33,488	7,074	40,562
Apr.	36,637	7,950	44,587
May	32,491	7,951	40,442
June	35,435	8,964	44,399
July	27,290	6,905	34,195
Aug.	3,785	2,035	5,820
Sept.	9,779	3,289	13,068
Oct.	22,546	4,582	27,128
Nov.	13,997	3,246	17,243
Dec.	23,492	4,717	28,209
1958	296,624	58,693	355,317
1957	339,308	70,975	410,283
1956	373,854	101,357	475,211
1955	377,598	75,081	452,679
1954	285,595	66,395	351,990
1953	366,535	117,260	483,795
1952	284,622	149,107	433,729
1951	281,634	133,160	414,794
1950	282,655	105,425	388,080

Ward's Automotive Reports.

Auto Exports

(Passenger cars—units)

1960	144,870	1956	192,708
1959	116,520	1955	254,336
1958	125,834	1954	206,544
1957	160,632	1953	186,262

Ward's Automotive Reports.

Bicycles Shipped

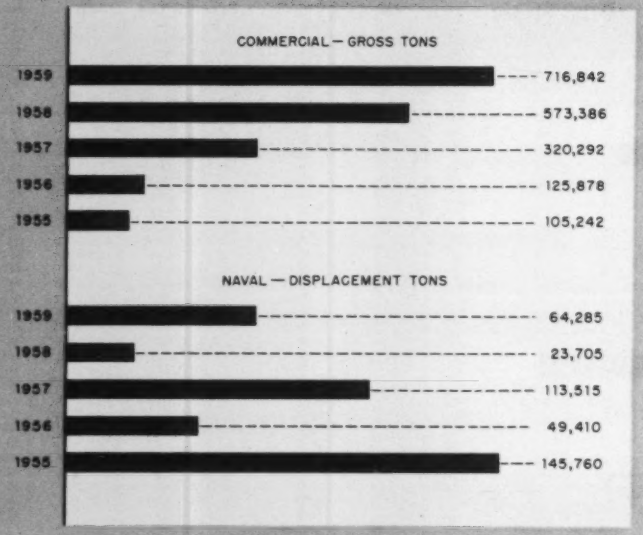
1960	2,592,900	1955	1,729,300
1959	2,562,300	1954	1,500,000
1958	2,100,000	1953	2,000,000
1957	1,900,000	1952	1,910,000
1956	1,739,710	1951	1,800,000

Transportation

METALWORKING FACTS AND FIGURES

SHIPS DELIVERED FROM PRIVATE YARDS

(UNITED STATES)



Shipbuilding in U. S. Private Yards

(Steel vessels of 1000 gross tons or more)

	1959		1958	
COMMERCIAL VESSELS	Number	Tons†	Number	Tons†
Under construction Jan. 1	75	1,513,730‡	93	2,156,192
Canceled during year	2	38,500	9	216,300
Contracted for during year	19	195,600	22	176,000
Totals	92	1,670,830	106	2,115,892
Launched during year	28	586,664	32	719,492
Delivered during year	32	716,842	31	573,386
Under construction Dec. 31	60	953,988	75	1,542,506
NAVAL VESSELS				
Under construction Jan. 1	55	334,940	46	250,580
Contracted for during year	13	62,855	17	78,485
Totals	68	397,795	63	329,065
Launched during year	15	65,795	15	55,960
Delivered during year	18	64,285	8	23,705
Under construction Dec. 31	52	333,510	55	335,360

†Gross tons for commercial vessels and displacement tons for Naval vessels.
‡Corrected.
Shipbuilders Council of America.

Civil Aircraft

(Complete airplanes shipped)

	1960		1959	
	Units	Value (Thousands)	Units	Value (Thousands)
January	747	$96,320	665	$49,590
February	855	112,721	619	49,805
March	867	90,299	736	34,014
April	768	127,183	745	68,142
May	802	131,262	759	81,212
June	694	109,704	779	65,098
July	539	119,965	630	88,444
August	420	97,534	647	95,280
September	427	108,410	432	75,950
October	618	81,002	739	103,646
November	630	88,068	705	76,911
December	769	82,199	786	111,545

YEARLY TOTALS

	Number	Value
1960	8,136	$1,244,667,000
1959	8,242	899,637,000
1958	6,882	500,540,000

U. S. Bureau of the Census.

Civil Aircraft Engines

(Shipments)

	1960		1959	
	Units	Value (Thousands)	Units	Value (Thousands)
January	1,025	$2,486	873	$2,635
February	1,039	2,639	954	2,729
March	1,141	3,210	921	2,612
April	1,064	2,483	947	2,728
May	894	2,266	921	2,276
June	772	1,757	979	2,668
July	579	1,671	844	2,043
August	873	2,269	747	1,701
September	864	2,370	804	2,237
October	862	2,356	1,051	3,897
November	n.a.	n.a.	1,060	4,319
December	n.a.	n.a.	1,051	3,550

YEARLY TOTALS

	Units	Value
1960	n.a.	n.a.
1959	11,152	$33,395,000
1958	10,233	67,843,000

n.a. = not available.
U. S. Bureau of the Census.

Commercial Ship Construction

(Steel self-propelled vessels of 2000 gross tons and over built in private U. S. yards.†)

Year	No.	Gross Tonnage	Year	No.	Gross Tonnage
1959	32	716,842	1953	45	570,326
1958	31	573,386	1952	31	397,156
1957	23	320,292	1951	10	147,569
1956	9	125,878	1950	26	415,499
1955	8	105,242	1949	34	538,873
1954	38	563,761	1948	29	164,482

†On Jan. 1, 1960, 60 steel vessels of 1000 gross tons or over aggregating 953,988 gross tons were under construction compared with 75 vessels aggregating 1,513,730 gross tons on Jan. 1, 1959.

TYPES OF VESSELS DELIVERED—1959

(Steel vessels of 1000 gross tons or over)

Type	Number	Gross Tonnage
Tanker	27	669,759
Ferry	2	6,649
Ore Carrier	2	26,350
Self-Unloader	1	14,084
Totals	32	716,842

CONTRACTED FOR IN 1959

(Steel vessels of 1000 gross tons or over)

Type	Number	Gross Tonnage
Cargo	15	147,600
Container Cargo	2	8,000
Ore Carrier	1	16,500
Tanker	1	23,500
Totals	19	195,600

UNCOMPLETED VESSELS

(Steel vessels of 1000 gross tons or over) Jan. 1, 1960

Type	Number	Gross Tonnage
Tanker	20	581,588
Cargo	34	315,200
Ore Carrier	2	33,000
Container Cargo	2	8,000
Geodetic Survey Vessel	1	2,800
Passenger-Cargo, Nuclear	1	13,400
Totals	60	953,988

Naval Shipbuilding

(PRIVATE YARDS' NAVAL BACKLOG)

Jan. 1, 1960

Type	Number	Displacement Tonnage
Guided Missile Destroyer	18	58,410
Guided Missile Frigate	11	49,225
Destroyer Escort	1	1,335
Attack Aircraft Carrier, Nuclear	1	66,900
Attack Aircraft Carrier	1	56,300
Guided Missile Cruiser, Nuclear	1	13,000
Guided Missile Frigate, Nuclear	1	7,200
Fleet Ballistic Missile Submarine, Nuclear	6	36,040
Submarine, Nuclear	8	24,830
Submarine	3	5,970
Submarine Tender	1	14,300
Totals	52	333,510

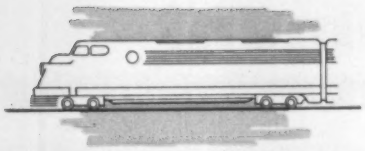
CONTRACTED FOR IN 1959

Guided Missile Destroyer	5	16,225
Submarine, Nuclear	4	13,400
Fleet Ballistic Missile Submarine	3	18,930
Submarine Tender	1	14,300
Totals	13	62,855

DELIVERED IN 1959

Landing Ship, Tank	1	3,680
Escort Vessel	3	3,955
Destroyer	5	14,530
Frigate	1	4,225
Ammunition Ship	3	24,000
Submarine, Nuclear	1	2,840
Radar Picket Submarine, Nuclear	1	5,655
Fleet Ballistic Missile Submarine	1	5,400
Totals	16	64,285

Shipbuilders Council of America.



New Locomotive Units Put in Service by Class I Railroads

	1960	1959	1958	1957	1956
1st Qtr	105	204	237	377	399
2nd Qtr	203	298	74	358	386
3rd Qtr	95	206	27	284	340
4th Qtr	50	134	96	297	328
Totals	453	842	434	1,316	1,453

Association of American Railroads.

Trucks Registered in U. S.

(Units).

	Privately Owned	Publicly Owned	Totals
1960	11.142.249	557.069	11.699.318
1958	10.659.310	528.189	11.187.499
1957	10.492.617	495.897	10.988.514
1956	10.261.827	461.185	10.723.012
1955	9.893.410	442.931	10.336.341
1954	9.406.191	427.181	9.833.372
1953	9,174,573	413,239	9,587,812

Automobile Manufacturers Association.

Buses

(Shipments from U. S. factories—units)

	1960	1959	1958	1957
Jan.	371	169	327	269
Feb.	241	143	308	238
Mar.	340	245	342	341
Apr.	366	253	344	506
May	451	282	241	462
June	364	267	91	389
July	424	233	358	309
Aug.	358	82	265	315
Sept.	211	134	216	243
Oct.	447	268	149	233
Nov.	238	179	167	241
Dec.	251	286	208	287
Totals	4,062	2,541	3,016	3,833

YEARLY TOTALS

1956	4,064	1951	9,460
1955	4,023	1950	4,908
1954	4,118	1949	5,511
1953	4,057	1948	12,299
1952	5,375	1947	19,110

Automobile Manufacturers Association.

New Transit Equipment

(Deliveries—units)

	Subway Surface Cars	Subway & Elevated Cars	Trolley Coaches	Motor Buses	Totals
1960*	0	416	0	2,700	3,116
1959	0	210	0	1,537	1,747
1958	0	428	0	1,698	2,126
1957	0	469	0	1,916	2,415
1956	0	376	0	2,759	3,135
1955	0	288	43	2,098	2,429
1954	0	260	0	2,220	2,485
1953	0	0	0	2,246	2,246
1952	19	0	224	1,749	1,992
1951	56	140	600	4,552	5,348
1950	4	199	179	2,668	3,050
1949	273	415	680	3,358	4,726
1948	478	248	1,430	7,009	9,165

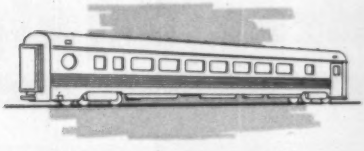
*Preliminary.
American Transit Association.

Automotive Battery Shipments

(Replacement only—thousands of units)

	1960	1959	1958	1957	1956	1955
Jan.	1,865	2.672	2.004	2.638	2.058	1.518
Feb.	1,641	1.791	1.803	1.961	1.340	1.691
Mar.	1,877	1.376	1.577	1.254	1.348	1.356
Apr.	1.545	1.437	1.242	1.178	1.368	1.315
May	1.650	1.593	1.454	1.605	1.761	1.614
June	2.072	2.118	1.773	1.878	1.807	1.842
July	2.131	2.556	2.101	2.469	2.178	2.078
Aug.	2.550	2.728	2.333	2.856	2.571	2.852
Sept.	2.708	2.889	2.704	2.688	2.711	3.120
Oct.	2.834	3.069	2.976	3.042	3.015	3.120
Nov.	2,634	2,799	2.262	2.359	2.592	2.097
Dec.	2,823	2,467	3,041	2,015	2,265	2,625
Totals	26,330	27,495	25,270	25,943	25,014	25,828

U. S. Department of Commerce.



Railroad Passenger Cars

(Domestic shipments—units)

	1960	1959	1958	1957	1956
Jan.	11	0	39	3	42
Feb.	10	0	18	11	53
Mar.	12	0	10	3	54
Apr.	21	0	0	7	25
May	24	3	2	6	44
June	13	0	16	17	36
July	7	0	20	15	22
Aug.	27	4	0	40	43
Sept.	32	6	3	185	42
Oct.	33	15	10	576	25
Nov.	21	14	4	5	5
Dec.	26	38	2	37	5
Totals	237	80	124	705	396

YEARLY TOTALS

1955	886	1952	117
1954	349	1951	179
1953	386	1950	964

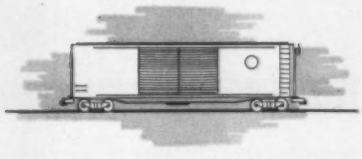
(Domestic orders—units)

	1960	1959	1958	1957	1956
Jan.	144	0	22	7	75
Feb.	10	36	5	15	6
Mar.	45	70	0	10	1
Apr.	0	0	0	0	5
May	0	3	0	1	0
June	25	25	0	12	53
July	40	0	0	10	0
Aug.	0	0	30	0	0
Sept.	0	51	0	0	70
Oct.	0	4	1	23	9
Nov.	0	4	5	0	0
Dec.	0	0	0	0	50
Totals	264	193	63	78	269

YEARLY TOTALS

1955	1,078	1952	520
1954	610	1951	261
1953	164	1950	102

American Railway Car Institute.



Freight Cars Ordered

(Domestic—units)

	Car-builders	Railroad Shops	Totals
1960	22,469	13,899	36,368
Jan.	3,940	1,809	5,749
Feb.	1,667	1,813	3,480
Mar.	1,887	120	2,007
Apr.	4,357	995	5,352
May	1,726	559	2,285
June	249	67	316
July	672	659	1,331
Aug.	708	625	1,333
Sept.	2,200	6	2,206
Oct.	906	4,958	5,864
Nov.	2,692	1,048	3,740
Dec.	1,465	1,240	2,705
1959	38,402	18,087	56,489
Jan.	1,164	2,938	4,102
Feb.	1,331	511	1,842
Mar.	7,367	3,415	10,782
Apr.	3,198	537	3,735
May	3,415	1,788	5,203
June	7,253	1,116	8,369
July	2,519	1,640	4,159
Aug.	1,653	0	1,653
Sept.	941	2	943
Oct.	2,722	0	2,722
Nov.	1,274	1,150	2,424
Dec.	5,565	4,990	10,555

YEARLY TOTALS

1958	12,430	5,088	17,518
1957	22,222	19,094	41,316
1956	30,705	8,183	38,888
1955	83,344	73,558	156,902
1954	14,240	7,736	21,976

American Railway Car Institute.

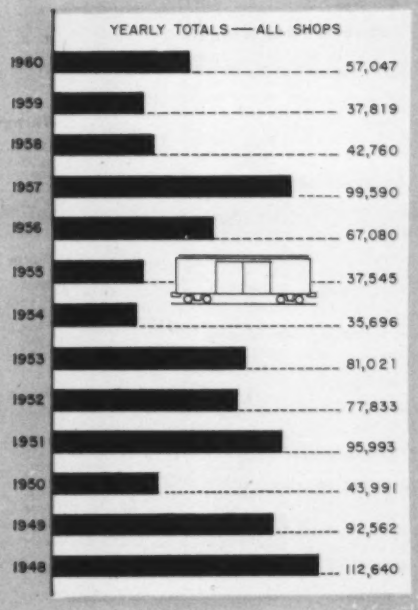
FREIGHT CAR SHIPMENTS

(Domestic—units)

	Car-builders	Railroad Shops	Totals
1960	37,219	19,828	57,047
Jan.	1,613	1,236	2,849
Feb.	3,525	1,527	5,052
Mar.	4,408	1,542	5,950
Apr.	4,200	1,389	5,589
May	3,564	2,381	5,945
June	3,873	2,345	6,218
July	2,650	1,412	4,062
Aug.	2,450	1,809	4,259
Sept.	2,929	1,371	4,300
Oct.	3,160	1,472	4,632
Nov.	2,205	1,734	3,939
Dec.	2,642	1,630	4,272
1959	24,532	13,287	37,819
Jan.	982	958	1,940
Feb.	1,727	829	2,556
Mar.	1,840	1,031	2,871
Apr.	2,334	1,407	3,741
May	2,263	1,095	3,358
June	2,935	1,023	3,958
July	3,138	1,137	4,275
Aug.	3,668	1,315	4,983
Sept.	1,508	1,099	2,605
Oct.	1,329	955	2,284
Nov.	1,226	992	2,218
Dec.	1,586	1,446	3,032

YEARLY TOTALS

1958	26,757	16,003	42,760
1957	56,398	43,192	99,590
1956	42,502	24,578	67,080
1955	23,786	13,759	37,545
1954	22,318	13,378	35,696



American Railway Car Institute.

Farm Equipment

METALWORKING FACTS AND FIGURES

FARM MACHINERY & EQUIPMENT

(Except tractors)

(Manufacturers' shipments—value in thousands)

	Totals	Domestic	Export
1960	$735,809	n.a.	n.a.
1959	1,131,876	$1,063,182	$68,694
1958	1,075,364	1,017,542	57,822
1957	897,649	828,113	69,536
1956	854,618	779,258	75,360
1955	912,157	844,370	67,787
1954	883,267	n.a.	n.a.

Plows and Listers

	Totals	Domestic	Export
1960	$49,171	n.a.	n.a.
1959	77,455	$73,110	$4,345
1958	73,908	68,607	5,301
1957	60,733	54,979	5,754
1956	60,956	54,586	6,370
1955	66,417	58,440	7,977
1954	66,506	57,445	9,061

Harrows, Rollers, Pulverizers, Stalk Cutters

1960	$71,079	n.a.	n.a.
1959	105,643	$98,652	$6,991
1958	92,054	85,074	6,980
1957	76,275	69,686	6,589
1956	73,775	66,751	7,024
1955	74,706	67,024	7,682
1954	70,605	63,759	6,846

Planting, Seeding, and Fertilizing Machinery

1960	$80,926	n.a.	n.a.
1959	110,662	$104,849	$5,813
1958	101,197	96,560	4,637
1957	87,228	82,727	4,501
1956	80,148	75,194	4,954
1955	89,098	84,648	4,450
1954	93,593	89,697	3,896

Cultivators and Weeders

1960	$38,577	n.a.	n.a.
1959	51,162	$48,592	$2,570
1958	48,552	46,624	1,928
1957	45,219	43,182	2,037
1956	49,033	46,390	2,643
1955	52,640	49,712	2,928
1954	42,584	39,304	3,280

Sprayers and Dusters

1960	$34,329	n.a.	n.a.
1959	45,236	$42,792	$2,444
1958	41,038	38,511	2,527
1957	40,007	36,399	3,608
1956	41,468	37,525	3,943
1955	38,254	33,695	4,559
1954	37,674	33,868	3,806

Harvesting Machinery

1960	$275,861	n.a.	n.a.
1959	343,808	$318,883	$24,925
1958	311,916	294,948	16,968
1957	254,390	233,857	20,533
1956	226,139	202,400	23,739
1955	243,561	223,552	20,009
1954	252,566	219,661	32,905

Haying Machinery

1960	$117,367	n.a.	n.a.
1959	163,654	$151,343	$12,311
1958	175,860	165,740	10,120
1957	148,139	130,384	17,755
1956	146,771	130,331	16,440
1955	168,447	157,968	10,479
1954	147,883	137,192	10,691

Machines for Preparing Crops for Market or for Use

	Totals	Domestic	Export
1960	$23,069	n.a.	n.a.
1959	41,411	$38,016	$3,395
1958	44,166	41,636	2,530
1957	38,634	36,095	2,539
1956	31,437	28,209	3,228
1955	33,070	29,511	3,559
1954	33,892	29,708	4,184

Farm Poultry Equipment

1959	$33,422	$31,231	$2,191
1958	41,302	38,610	2,692
1957	29,690	27,408	2,282
1956	36,088	33,915	2,173
1955	28,429	27,085	1,344
1954	25,566	24,153	1,413

Farm Dairy Machines and Equipment

1960	$14,585	n.a.	n.a.
1959	22,031	$20,637	$1,394
1958	20,211	18,210	2,001
1957	20,126	18,473	1,653
1956	21,455	19,741	1,714
1955	19,260	17,241	2,019
1954	22,183	21,310	873

Barn Equipment

1959	$22,788	$22,093	$695
1958	20,393	19,895	498
1957	17,733	17,369	364
1956	15,460	15,140	320
1955	12,405	12,084	321
1954	12,856	n.a.	n.a.

Barnyard Equipment

1959	$33,891	$33,665	$226
1958	28,286	28,159	127
1957	18,394	18,272	122
1956	15,619	15,452	167
1955	18,381	n.a.	n.a.
1954	16,742	n.a.	n.a.

Farm Elevators and Blowers

1959	$37,369	$36,443	$926
1958	38,980	37,952	1,028
1957	34,979	33,954	1,025
1956	32,824	31,358	1,466
1955	38,251	36,808	1,443
1954	37,072	n.a.	n.a.

Farm Wagons, Trucks, and Other Farm Transportation Equipment

1960	$30,845	n.a.	n.a.
1959	43,344	$42,876	$468
1958	37,501	37,016	485
1957	26,102	25,328	774
1956	23,445	22,266	1,179
1955	29,238	28,221	1,017
1954	23,545	n.a.	n.a.

n.a.=not available.
U. S. Bureau of the Census.

Pumps and Windmills

(Factory shipments—units)

	Hand & Windmill Pumps	Pump Jacks	Cylinders	Windmill Heads	Windmill Towers
1960	97,557	9,941	87,677	6,731	3,646
Jan.	7,983	1,045	7,444	250	103
Feb.	7,334	1,080	6,052	517	250
Mar.	8,874	965	7,092	377	257
Apr.	7,826	882	7,238	942	698
May	8,893	414	7,749	645	261
June	11,868	685	8,799	929	396
July	7,586	780	7,062	433	271
Aug.	10,848	1,265	8,686	566	260
Sept.	7,994	785	8,676	683	332
Oct.	6,185	642	7,718	629	406
Nov.	4,722	657	6,370	405	226
Dec.	7,444	741	4,791	355	186
1959	119,518	18,956	104,680	8,481	4,061
Jan.	9,666	2,653	8,807	481	134
Feb.	8,501	2,302	7,228	422	253
Mar.	9,507	1,797	8,438	681	314
Apr.	12,092	1,189	9,371	982	599
May	9,684	1,147	9,621	815	419
June	11,795	1,504	9,804	979	425
July	12,787	1,773	11,325	719	354
Aug.	13,717	1,744	10,194	761	351
Sept.	10,218	1,405	9,604	919	353
Oct.	10,157	1,212	9,473	691	368
Nov.	5,035	804	5,710	547	208
Dec.	6,359	1,426	5,105	484	283
1958	110,651	14,382	95,827	6,983	3,071
1957	142,621	12,035	105,952	6,962	3,208
1956	167,575	21,386	130,863	9,446	4,007
1955	206,881	26,654	157,983	10,482	4,470

U. S. Bureau of the Census.

Domestic Water Systems

(Factory shipments—units)

	Jet	Nonjet	Convertible Jet	Submersible	Totals
1960	299,167	71,839	214,264	101,554	686,824
Jan.	22,973	4,745	15,675	6,391	49,784
Feb.	24,417	6,230	17,799	5,351	53,797
Mar.	21,028	6,690	16,253	6,387	50,358
Apr.	23,403	6,837	18,929	7,698	56,867
May	29,588	7,247	22,073	8,890	67,798
June	33,506	7,353	20,792	10,893	72,544
July	31,753	7,228	22,141	10,550	71,672
Aug.	28,134	7,021	21,625	10,893	67,673
Sept.	26,015	5,904	18,590	10,246	60,755
Oct.	22,030	4,910	16,143	9,338	52,421
Nov.	17,836	3,965	13,175	7,161	42,137
Dec.	18,484	3,709	11,069	7,756	41,018
1959	353,343	87,545	247,622	97,989	786,499
Jan.	29,058	6,509	19,398	6,530	61,495
Feb.	23,617	7,474	14,462	5,552	51,105
Mar.	30,477	6,528	20,032	5,552	62,589
Apr.	31,832	8,133	20,922	8,284	69,171
May	32,170	8,229	24,016	8,097	72,512
June	37,765	8,814	24,710	10,552	81,841
July	35,914	9,262	27,562	11,257	83,995
Aug.	33,277	7,822	26,168	9,388	76,655
Sept.	32,399	7,918	24,477	9,880	74,674
Oct.	25,728	7,448	19,564	8,818	61,558
Nov.	20,655	4,540	13,475	6,287	44,957
Dec.	20,451	4,868	12,836	7,792	45,947
1958	335,263	95,080	186,994	77,633	694,970
1957	360,700	112,483	185,880	65,306	724,369
1956	572,934	134,495	n.a.	62,875	770,304
1955	593,367	151,382	n.a.	51,583	796,332

n.a.=not available.
U. S. Bureau of the Census.

Tractors

(Manufacturers' shipments—units with value in thousands)

	—Wheel Type†—		—Garden Type—	
	Units	Value	Units	Value
1960	150,615	$341,700	n.a.	n.a.
1959	255,273	566,432	327,083	$37,227
1958	239,161	494,131	227,073	26,492
1957	231,061	419,648	181,806	22,135
1956	222,581	389,841	203,231	25,115
1955	326,437	518,731	192,624	24,000
1954	253,673	396,466	191,235	24,844
1953	387,422	546,641	211,798	29,269

n.a.=not available.
†Except garden and contractors' off-highway types.
U. S. Bureau of the Census.

Business Indexes

METALWORKING FACTS AND FIGURES

INDEXES OF INDUSTRIAL PRODUCTION

(Federal Reserve Board—1957 = 100)

Total Industrial Production

(Seasonally adjusted)

	1960	1959	1958	1957	1956
Jan.	111	100	92	101	99
Feb.	110	102	89	102	99
Mar.	109	104	88	102	98
Apr.	109	107	87	101	100
May	110	109	89	101	99
June	109	110	92	102	99
July	110	108	93	101	95
Aug.	108	103	95	102	99
Sept.	107	103	95	100	101
Oct.	106	102	96	98	101
Nov.	105	103	99	96	101
Dec.	103	109	100	94	102

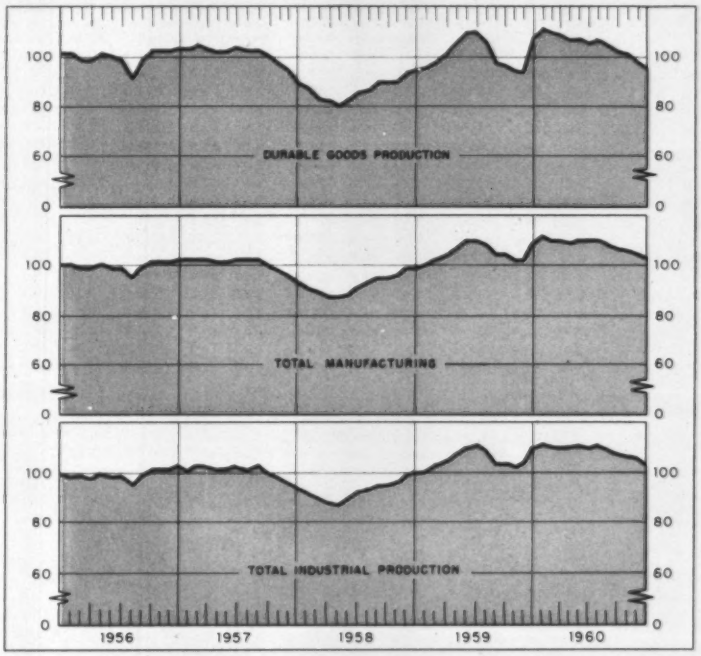
YEARLY INDEXES

1960	108	1955	96	1950	74
1959	105	1954	85	1949	64
1958	93	1953	91	1948	68
1957	100	1952	84	1947	65
1956	99	1951	81	1946	59

Total Manufacturing

(Seasonally adjusted)

	1960	1959	1958	1957	1956
Jan.	112	100	91	102	100
Feb.	110	102	89	102	99
Mar.	110	104	87	102	99
Apr.	109	107	87	101	100
May	110	110	88	101	99
June	110	110	91	102	99
July	110	108	93	102	94
Aug.	108	104	95	102	99
Sept.	107	104	95	100	101
Oct.	106	102	96	98	101
Nov.	104	102	99	96	101
Dec.	103	109	99	94	102



Durable Goods

(Seasonally adjusted)

	1960	1959	1958	1957	1956
Jan.	111	96	87	103	101
Feb.	109	98	83	104	99
Mar.	108	101	82	103	99
Apr.	106	105	80	102	101
May	107	109	82	102	100
June	105	110	85	103	99
July	106	105	86	102	91
Aug.	104	98	89	102	99
Sept.	102	97	89	100	102
Oct.	101	95	89	97	102
Nov.	98	96	94	94	102
Dec.	96	107	95	90	103

Primary Metals

(Seasonally adjusted)

	1960	1959	1958	1957	1956
Jan.	115	92	75	107	110
Feb.	110	102	70	107	109
Mar.	106	109	68	105	110
Apr.	99	113	64	102	111
May	94	122	70	102	109
June	88	118	78	103	106
July	85	81	77	104	48
Aug.	83	46	82	104	94
Sept.	80	45	84	100	112
Oct.	78	43	90	95	111
Nov.	74	79	90	90	110
Dec.	70	114	90	82	108

Metal Fabricating

(Seasonally adjusted)

	1960	1959	1958	1957	1956
Jan.	109	99	91	100	99
Feb.	108	99	87	101	97
Mar.	107	101	86	101	97
Apr.	104	104	81	101	98
May	108	109	86	101	96
June	108	112	90	102	96
July	109	111	92	102	94
Aug.	108	106	97	102	96
Sept.	106	106	98	100	99
Oct.	105	99	96	99	99
Nov.	101	95	96	97	99
Dec.	101	105	99	95	100

Consumer Price Index

(1947-49=100)

	1960	1959	1958	1957
January	128.4	123.6	122.3	118.2
February	128.6	123.7	122.5	118.7
March	128.7	123.7	122.8	118.9
April	128.2	123.9	123.5	119.3
May	128.3	124.0	123.6	119.6
June	128.5	124.5	123.7	120.2
July	128.6	124.9	123.9	120.8
August	128.6	124.8	123.7	121.0
September	128.8	125.2	123.7	121.1
October	127.3	125.5	123.7	121.1
November	127.4	125.6	123.9	121.6
December	127.5	125.5	123.7	121.6

MONTHLY AVERAGES

1960	126.5	1958	123.5
1959	124.6	1957	120.2

U. S. Bureau of Labor Statistics.

Wholesale Price Indexes

(1947-49=100)

	ALL COMMODITIES			ALL COMMODITIES OTHER THAN FARM PRODUCTS AND FOOD		
	1960	1959	1958	1960	1959	1958
January	119.3	119.5	118.9	128.8	127.5	126.1
February	119.3	119.5	119.0	128.7	127.8	125.7
March	120.0	119.6	119.7	128.6	128.1	125.7
April	120.0	120.0	119.8	128.7	128.3	125.5
May	119.7	119.9	119.5	128.2	128.4	125.3
June	119.5	119.7	119.2	128.2	128.2	125.3
July	119.7	119.5	119.2	128.2	128.4	125.6
August	119.2	119.1	119.1	128.2	128.4	126.1
September	119.2	119.7	119.1	127.9	128.4	126.2
October	119.6	119.1	119.0	128.0	128.4	126.4
November	119.6	118.9	119.2	127.9	128.5	126.6
December	119.5	118.9	119.2	127.9	128.6	127.2

U. S. Bureau of Labor Statistics.

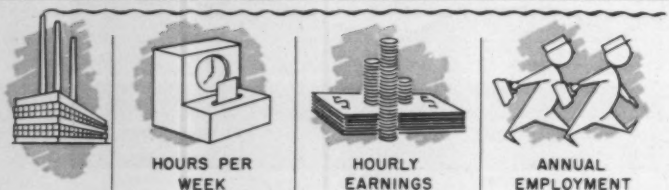
Labor

METALWORKING FACTS AND FIGURES

METALWORKING PRODUCTION WORKERS

	PRIMARY METALS			FABRICATED METAL PRODUCTS			MACHINERY (Except Electrical)			ELECTRICAL MACHINERY			TRANSPORTATION EQUIPMENT			INSTRUMENTS (Related Products)		
	Avg Hourly Wages	Avg Weekly Hours	No. of Workers (Thousands)	Avg Hourly Wages	Avg Weekly Hours	No. of Workers (Thousands)	Avg Hourly Wages	Avg Weekly Hours	No. of Workers (Thousands)	Avg Hourly Wages	Avg Weekly Hours	No. of Workers (Thousands)	Avg Hourly Wages	Avg Weekly Hours	No. of Workers (Thousands)	Avg Hourly Wages	Avg Weekly Hours	No. of Workers (Thousands)
1960 (Avg)	$2.83	38.8	956.5	$2.45	40.5	833.8	$2.56	40.8	1,137.0	$2.30	39.9	864.4	$2.75	40.5	1,157.7	$2.36	40.3	226.1
Jan.	2.87	41.1	1,048.3	2.45	41.2	856.6	2.55	41.3	1,178.8	2.28	40.7	892.1	2.76	42.0	1,238.7	2.32	40.6	230.5
Feb.	2.86	40.3	1,051.5	2.43	40.5	863.3	2.55	41.0	1,191.0	2.28	39.9	890.0	2.74	40.8	1,244.8	2.34	40.2	231.3
Mar.	2.85	40.1	1,042.6	2.42	40.5	863.8	2.56	41.2	1,186.1	2.28	40.1	878.7	2.73	40.6	1,221.2	2.35	40.8	230.5
Apr.	2.85	39.4	1,019.8	2.42	39.9	836.9	2.55	40.8	1,176.4	2.27	39.2	860.4	2.71	39.7	1,187.1	2.33	40.1	229.8
May	2.82	38.9	992.6	2.45	40.8	836.5	2.57	41.3	1,159.3	2.29	39.9	855.1	2.73	40.9	1,173.6	2.34	40.5	227.7
June	2.82	38.9	970.3	2.45	40.9	840.1	2.57	41.2	1,154.1	2.30	40.1	858.7	2.74	40.5	1,127.2	2.35	40.7	227.5
July	2.81	38.7	923.8	2.46	40.5	817.9	2.57	40.9	1,130.4	2.30	39.3	849.6	2.74	40.2	1,104.8	2.37	40.4	223.4
Aug.	2.80	38.1	909.8	2.45	41.0	819.4	2.56	40.5	1,111.6	2.30	39.9	861.4	2.75	39.6	1,036.2	2.37	40.5	226.1
Sept.	2.81	38.0	905.0	2.48	40.7	833.0	2.57	40.3	1,104.4	2.32	40.1	876.9	2.81	40.2	1,135.1	2.38	40.1	225.4
Oct.	2.81	37.9	891.4	2.47	40.6	833.8	2.58	40.4	1,086.6	2.32	40.2	839.1	2.81	41.0	1,149.3	2.38	40.4	222.9
Nov.	2.79	37.4	870.3	2.46	39.9	816.8	2.59	40.1	1,085.3	2.33	39.9	868.8	2.79	40.1	1,146.6	2.38	40.5	222.0
Dec.	2.83	37.2	851.9	2.48	39.2	795.6	2.60	39.9	1,079.7	2.36	39.1	844.1	2.80	39.8	1,127.8	2.41	39.1	217.1
1959 (Avg)	2.79	40.4	916.4	2.37	41.1	831.6	2.60	41.3	1,134.1	2.22	40.5	839.7	2.66	40.5	1,189.5	2.28	40.9	222.3
1958 (Avg)	2.65	38.1	801.0	2.27	40.0	795.8	2.38	39.8	1,039.3	2.15	39.6	750.1	2.53	39.8	1,124.0	2.19	39.9	205.3
1957 (Avg)	2.50	39.5	1,081.6	2.18	40.8	892.8	2.30	41.0	1,255.7	2.07	40.1	857.7	2.41	40.4	1,333.0	2.11	40.3	226.2
1956 (Avg)	2.36	40.9	1,097.4	2.07	41.2	890.5	2.21	42.2	1,278.7	1.96	40.8	870.3	2.31	40.9	1,354.1	2.01	40.8	230.3
1955 (Avg)	2.24	41.2	1,084.8	1.98	41.6	893.6	2.09	41.8	1,178.6	1.88	40.7	822.0	2.23	41.9	1,467.7	1.91	40.8	233.8

U. S. Department of Labor.



	HOURS PER WEEK (average)	HOURLY EARNINGS (average)	ANNUAL EMPLOYMENT (average)
1960	40.1 HOURS	$2.56	5,175,500
1959	40.8 HOURS	$2.47	5,133,600
1958	39.5 HOURS	$2.36	4,805,500

Work Stoppages

	Number of Stoppages Started	Workers Involved	Mandays Lost
1960*	3,250	1,375,000	19,250,000
1959	3,708	1,830,000	69,000,000
1958	3,694	2,060,000	23,900,000
1957	3,673	1,390,000	16,500,000
1956	3,825	1,900,000	33,100,000
1955	4,320	2,650,000	28,200,000
1954	3,468	1,530,000	22,600,000

*Preliminary.
U. S. Department of Labor.

METALWORKING WAGE & SALARY WORKERS

(In thousands)

	Primary Metals	Fabricated Metal Products	Machinery, Except Electrical	Electrical Machinery	Transportation Equip.	Instruments, etc.	TOTALS
1960 (Avg)	1,185.5	1,078.1	1,637.8	1,304.9	1,639.7	350.5	7,196.5
Jan.	1,275.1	1,099.2	1,675.0	1,318.6	1,722.3	352.1	7,424.3
Feb.	1,280.7	1,106.2	1,691.1	1,318.4	1,721.4	353.6	7,471.4
Mar.	1,273.3	1,097.3	1,687.7	1,310.0	1,700.9	353.7	7,422.9
Apr.	1,250.5	1,079.8	1,677.8	1,293.7	1,665.1	353.1	7,320.0
May	1,224.9	1,080.8	1,660.9	1,289.6	1,652.8	351.3	7,260.3
June	1,203.1	1,086.3	1,658.6	1,297.0	1,607.9	352.8	7,208.0
July	1,156.1	1,063.2	1,635.3	1,292.4	1,590.7	348.5	7,086.2
Aug.	1,142.1	1,064.9	1,615.2	1,308.0	1,524.8	351.9	7,006.9
Sept.	1,133.3	1,081.0	1,605.1	1,326.7	1,620.0	350.8	7,116.9
Oct.	1,118.1	1,078.9	1,585.4	1,284.9	1,629.8	348.1	7,045.2
Nov.	1,095.1	1,061.3	1,583.2	1,320.5	1,631.0	347.3	7,038.4
Dec.	1,073.4	1,038.0	1,578.0	1,299.2	1,609.7	342.9	6,941.2
1959 (Avg)	1,137.7	1,069.0	1,611.7	1,241.6	1,670.8	338.9	7,069.7
1958 (Avg)	1,104.4	1,029.9	1,501.2	1,118.8	1,592.8	315.2	6,662.3
1957 (Avg)	1,309.7	1,132.3	1,737.9	1,223.3	1,878.1	337.9	7,619.2
1956 (Avg)	1,312.6	1,119.0	1,730.1	1,202.1	1,823.4	335.6	7,522.8
1955 (Avg)	1,284.1	1,108.6	1,592.3	1,123.6	1,832.1	321.0	7,261.7

U. S. Department of Labor.

Steel Industry's Minimum Labor Rates

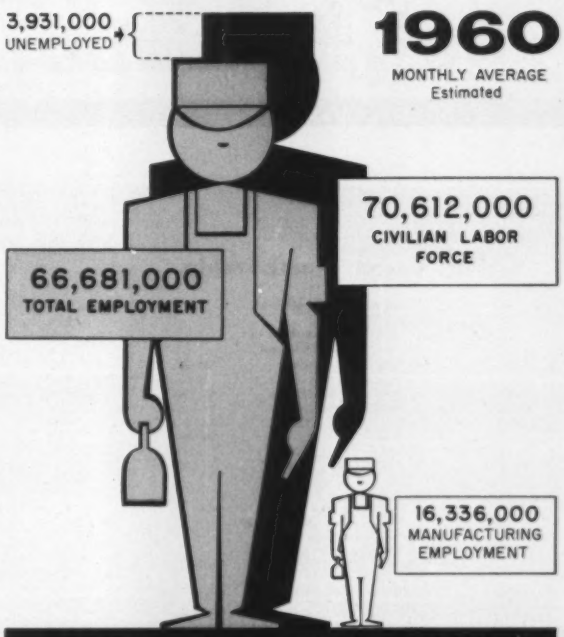
	Hourly wage (cents)	Per cent over 1915
1915	20.0	....
Feb. 1, 1916	22.0	10.0
May 1, 1916	25.0	25.0
Dec. 15, 1916	27.5	37.5
May 1, 1917	30.0	50.0
Oct. 1, 1917	33.0	65.0
Apr. 16, 1918	38.0	90.0
Aug. 1, 1918	42.0	110.0
Oct. 1, 1918	46.2	131.0
Feb. 1, 1920	50.6	153.0
May 16, 1921	40.5	102.5
July 16, 1921	37.0	85.0
Aug. 29, 1921	30.0	50.0
Sept. 1, 1922	36.0	80.0
Apr. 16, 1923	40.0	100.0
August, 1923	44.0	120.0
Oct. 1, 1931	39.6	98.0
May 16, 1932	33.7	68.5
Aug. 19, 1933 (NRA)	40.0	100.0
Apr. 1, 1934	44.0	120.0
November, 1936	52.5	162.5
March, 1937	62.5	212.5
April, 1941	72.5	262.5
July, 1942	78.0	290.0
February, 1946	96.5	382.5
April, 1947	109.0	445.0
July 16, 1948	118.5	492.5
Dec. 1, 1950	131.0	555.0
Mar. 1, 1952	143.5	617.5
June 12, 1953	152.0	660.0
July 1, 1954	157.0	685.0
July 1, 1955	168.5	742.5
Aug. 3, 1956	182.0	810.0
July 1, 1957	189.0	845.0
July 1, 1958	196.0	880.0
Dec. 1, 1960	203.0	915.0

Compiled by STEEL.

Steel Employment, Wages, Hours, and Payrolls*

	Number Employees (Wage and Salaried Workers)	Avg Hr Earnings (Hourly Wage Earners Only)	Avg Hr per Week (Hourly Wage Earners Only)	Total Payrolls (Wages and Salaries)
1960				
Jan.	640,933	$3.399	39.4	$398,789,456
Feb.	642,506	3.372	40.0	381,387,774
Mar.	637,328	3.343	40.2	398,847,573
Apr.	625,508	3.381	36.5	357,178,867
May	603,711	3.353	34.9	339,780,711
June	579,629	3.342	34.5	315,994,782
July	554,069	3.382	30.6	286,967,361
Aug.	542,668	3.313	34.2	300,259,708
Sept.	531,111	3.342	34.2	287,182,482
Oct.	516,164	3.321	34.1	284,815,307
Nov.	499,087	3.337	34.0	270,442,490
Dec.	485,906	3,370	32.8	267,882,401
1959				
Jan.	554,636	$3.313	38.1	$335,154,861
Feb.	580,354	3.326	40.4	333,932,722
Mar.	603,635	3.336	41.0	385,413,953
Apr.	620,601	3.340	40.7	385,488,363
May	634,668	3.346	39.9	396,914,755
June	640,920	3.339	40.6	398,240,118
July	**	**	**	**
Aug.	**	**	**	**
Sept.	**	**	**	**
Oct.	**	**	**	**
Nov.	**	**	**	**
Dec.	629,463	3.343	40.9	400,274,576
1958				
Jan.	546,518	$3.042	35.1	$284,219,513
Feb.	526,583	3.088	34.2	249,947,205
Mar.	512,328	3.092	33.6	259,533,397
Apr.	502,653	3.108	33.1	247,433,391
May	500,369	3.095	34.2	257,965,765
June	510,828	3.113	35.5	266,065,538
July	508,876	3.248	32.4	267,486,586
Aug.	514,895	3.265	34.9	283,058,572
Sept.	527,407	3.274	36.5	294,277,422
Oct.	540,590	3.241	39.1	326,307,323
Nov.	542,464	3.314	36.5	306,281,444
Dec.	547,902	3.291	37.3	325,334,615
1957				
Jan.	643,718	$2.831	40.2	$344,145,379
Feb.	643,199	2.852	39.8	312,772,278
Mar.	639,420	2.834	38.7	329,646,227
Apr.	636,681	2.837	38.0	317,552,685
May	633,049	2.824	37.9	322,790,329
June	633,121	2.862	36.7	310,205,988
July	632,044	2.983	34.8	319,546,543
Aug.	629,972	2.990	36.5	328,261,509
Sept.	618,218	3.022	36.4	315,222,693
Oct.	608,245	2.992	38.0	330,029,829
Nov.	594,372	3.013	36.1	302,030,888
Dec.	575,885	3.006	32.9	286,081,308
MONTHLY AVERAGES AND TOTAL PAYROLLS				
1960	571,552	$3.349	35.7	$3,889,755,293
1959†	515,057	3.417	36.9	3,672,178,069
1958	523,451	3.433	36.0	3,370,138,474
1957	623,834	3.125	37.6	3,820,947,710
1956†	620,734	2.875	38.9	3,625,156,352
1955	624,764	2.673	39.5	3,435,666,105
1954	581,922	2.493	36.8	2,785,316,054
1953	650,205	2.392	39.6	3,214,563,715
1952†	621,907	2.267	36.6	2,698,068,256
1951	638,327	2.049	40.4	2,755,152,828
1950	592,261	1.842	39.3	2,236,952,661
1949	580,824	1.807	35.4	1,939,293,140
1948	591,547	1.713	39.4	2,088,758,385
1947	573,669	1.592	39.0	1,858,257,885
1946	538,148	1.437	36.0	1,451,263,460
1945	515,003	1.306	44.1	1,546,086,787

*Represents companies comprising 93 to 96 per cent of total industry employment. Starting 1957, employment data exclude those engaged in fabricating.
**No reports issued because of steelworkers' strike.
†Reflects influences of steelworkers' strikes.
American Iron & Steel Institute.



TOTAL U.S. EMPLOYMENT†

(In thousands)

	Civilian Labor Force	Total Employment	Unemployment	Mfg. Employment
1960				
Jan.	68,168	64,020	4,149	16,470
Feb.	68,449	64,520	3,931	16,520
Mar.	68,473	64,267	4,206	16,478
Apr.	69,819	66,159	3,660	16,380
May	70,667	67,208	3,459	16,348
June	73,002	68,579	4,423	16,422
July	72,706	68,689	4,017	16,250
Aug.	72,070	68,283	3,788	16,398
Sept.	71,155	67,767	3,388	16,505
Oct.	71,069	67,490	3,579	16,313
Nov.	71,213	67,182	4,031	16,129
Dec.	70,549	66,009	4,540	15,830
1959				
Jan.	67,430	62,706	4,724	15,674
Feb.	67,471	62,723	4,749	15,771
Mar.	68,189	63,828	4,362	15,969
Apr.	68,639	65,012	3,627	16,034
May	69,405	66,016	3,389	16,187
June	71,324	67,342	3,982	16,455
July	71,338	67,594	3,744	16,410
Aug.	70,667	67,241	3,426	16,169
Sept.	69,577	66,347	3,230	16,367
Oct.	70,103	66,831	3,272	16,197
Nov.	69,310	65,640	3,670	16,280
Dec.	69,276	65,699	3,577	16,484
1958				
Jan.	66,732	62,238	4,494	15,865
Feb.	67,160	61,988	5,173	15,593
Mar.	67,510	62,311	5,198	15,355
Apr.	68,027	62,907	5,120	15,104
May	68,965	64,061	4,904	15,023
June	70,418	64,981	5,437	15,206
July	70,473	65,179	5,294	15,161
Aug.	70,067	65,367	4,699	15,462
Sept.	68,740	64,629	4,111	15,755
Oct.	69,111	65,304	3,805	15,536
Nov.	68,485	64,653	3,833	15,795
Dec.	68,081	63,973	4,108	15,749
MONTHLY AVERAGES				
1960	70,612	66,681	3,931	16,336
1959	69,394	65,581	3,813	16,168
1958	68,847	63,966	4,881	15,468
1957	67,946	65,011	2,936	16,782
1956	67,530	64,979	2,551	16,903
1955	65,847	63,193	2,654	16,563
1954	64,468	61,238	3,230	15,966
1953	63,815	62,213	1,602	17,238
1952	62,966	61,293	1,673	16,334
1951	62,884	61,005	1,879	16,104
1950	63,099	59,957	3,142	14,967
1949	62,105	58,710	3,395	14,178
1948	61,442	59,378	2,064	15,321
1947	60,168	58,027	2,142	15,290
1946	57,520	55,250	2,270	14,461
1945	53,860	52,820	1,040	15,362

†Data for 1957 forward not exactly comparable with prior data.
U. S. Departments of Commerce and Labor.

Labor

METALWORKING FACTS AND FIGURES

Labor Union Membership

(Thousands of members)

Year	AFL-CIO	Independent or Unaffiliated Unions	Totals
1960*	14,000	2,500	16,500
1959*	14,500	3,000	17,500
1958	14,993	3,100	18,093
1957*	16,800	1,600	18,400
1956	16,782	1,573	18,328
1955	15,877	1,688	17,565

	American Federation of Labor	Congress of Industrial Organizations	Independent or Unaffiliated Unions	Totals
1954	10,748	5,185	1,828	17,757
1953*	10,900	5,200	1,800	17,900
1952*	9,500	5,000	2,000–2,500	16,500–17,000
1951	9,500	5,000	2,000–2,500	16,500–17,000
1950	7,143	n.a.	2,400–2,800	14,000–16,000
1949	7,241	n.a.	2,000–2,300	14,000–16,000
1948	7,221	n.a.	2,200–2,500	14,000–16,000
1947	7,578	6,000	1,836	15,414
1946	7,152	6,000	1,822	14,974
1945	6,931	6,000	1,865	14,796
1944	6,807	5,935	1,879	14,621
1943	6,564	5,285	1,793	13,642
1942	5,483	4,196	1,094	10,783
1941	4,569	5,000	920	10,489
1940	4,247	3,625	1,072	8,944
1939	4,006	4,000	974	8,980
1938	3,623	4,035	604	8,265
1937	2,861	3,718	639	7,218
1936	3,422	....	742	4,164
1935	3,045	....	683	3,728
1934	2,608	....	641	3,249
1933	2,127	....	730	2,857
1932	2,532	....	694	3,226
1931	2,890	....	636	3,526
1930	2,961	....	671	3,632
1929	2,934	....	691	3,625
1928	2,896	....	671	3,567
1927	2,813	....	787	3,600
1926	2,804	....	758	3,562
1925	2,877	....	689	3,566
1924	2,868	....	683	3,549
1923	2,926	....	703	3,629
1922	3,196	....	754	3,950
1921	2,907	....	815	4,722
1920	4,079	....	955	5,034
1919	3,260	....	786	4,046
1918	2,726	....	642	3,368
1917	2,371	....	605	2,976
1916	2,073	....	649	2,722
1915	1,946	....	614	2,560
1914	2,021	....	626	2,647
1913	1,996	....	665	2,661
1912	1,770	....	635	2,405
1911	1,782	....	506	2,315
1910	1,562	....	554	2,116
1909	1,483	....	482	1,965
1908	1,587	....	505	2,092
1907	1,539	....	538	2,077

*Estimated by STEEL.
n.a. = not available.
U. S. Department of Labor.

Labor Turnover

(Rate per 100 employees in manufacturing industries)

	ACCESSIONS				SEPARATIONS					
	New Hires		Totals		Quits		Layoffs		Totals	
	1960	1959	1960	1959	1960	1959	1960	1959	1960	1959
Jan.	1.9	1.5	3.6	3.3	1.0	0.9	1.3	1.7	2.9	3.1
Feb.	1.7	1.7	2.9	3.3	1.0	0.8	1.5	1.3	3.0	2.6
Mar.	1.5	1.9	2.7	3.6	1.0	1.0	2.2	1.3	3.7	2.8
Apr.	1.4	2.0	2.8	3.5	1.1	1.1	2.0	1.3	3.6	3.0
May	1.7	2.2	3.2	3.6	1.1	1.3	1.6	1.1	3.3	2.9
June	2.3	3.0	3.9	4.4	1.1	1.3	1.7	1.0	3.3	2.8
July	1.7	2.2	2.9	3.3	1.1	1.3	2.0	1.4	3.6	3.3
Aug.	1.9	2.5	3.8	3.9	1.5	1.8	2.2	1.4	4.3	3.7
Sept.	1.9	2.6	3.8	3.9	1.9	2.2	2.0	1.5	4.4	4.3
Oct.	1.5	2.0	2.8	3.1	1.0	1.4	2.2	2.8	3.8	4.7
Nov.	1.0	1.5	2.3	3.0	0.7	1.0	2.7	2.6	3.9	4.1
Dec.	0.7	1.3	1.8	3.8	0.6	0.9	2.9	1.7	3.9	3.1

U. S. Department of Labor.

Gross Wages and Hours in Selected Industries

(Production workers)

Iron and Steel Foundries

	EARNINGS (Hourly avg)		HOURS (Weekly avg)	
	1960	1959	1960	1959
Jan.	$2.49	$2.40	40.3	39.5
Feb.	2.50	2.40	39.7	39.7
Mar.	2.50	2.42	39.6	40.3
Apr.	2.48	2.43	38.5	40.5
May	2.49	2.45	38.8	41.2
June	2.49	2.44	39.2	41.4
July	2.49	2.42	39.2	40.7
Aug.	2.48	2.41	38.7	39.9
Sept.	2.52	2.44	38.0	39.4
Oct.	2.52	2.44	38.0	39.4
Nov.	2.51	2.43	37.5	38.8
Dec.	...	2.47	...	40.2

Primary Smelting and Refining of Nonferrous Metals

	1960	1959	1960	1959
Jan.	$2.63	$2.54	41.3	41.4
Feb.	2.63	2.55	40.7	41.2
Mar.	2.61	2.54	41.4	40.9
Apr.	2.66	2.55	42.2	41.0
May	2.62	2.55	41.4	41.1
June	2.64	2.57	41.0	40.8
July	2.67	2.58	41.1	40.8
Aug.	2.70	2.60	40.9	40.2
Sept.	2.70	2.69	41.3	41.6
Oct.	2.69	2.66	41.0	40.8
Nov.	2.69	2.65	41.0	41.1
Dec.	...	2.64	...	40.1

Fabricated Structural Metal Products

	1960	1959	1960	1959
Jan.	$2.45	$2.36	40.1	39.4
Feb.	2.45	2.37	39.8	39.5
Mar.	2.44	2.38	40.0	39.8
Apr.	2.45	2.39	40.3	40.3
May	2.46	2.41	41.0	40.7
June	2.46	2.42	41.5	41.4
July	2.47	2.42	41.4	40.4
Aug.	2.46	2.40	41.4	41.1
Sept.	2.48	2.39	41.2	40.9
Oct.	2.48	2.39	41.0	40.4
Nov.	2.48	2.42	40.7	39.1
Dec.	...	2.44	...	40.4

Agricultural Machinery and Tractors

	1960	1959	1960	1959
Jan.	$2.60	$2.49	39.9	40.3
Feb.	2.59	2.56	38.9	41.1
Mar.	2.59	2.58	39.7	41.8
Apr.	2.57	2.57	40.0	41.3
May	2.56	2.57	40.2	41.3
June	2.57	2.58	40.0	41.3
July	2.58	2.57	39.7	40.2
Aug.	2.59	2.54	40.2	39.9
Sept.	2.61	2.56	40.1	39.8
Oct.	2.62	2.59	40.0	39.5
Nov.	2.66	2.59	39.5	38.8
Dec.	...	2.59	...	39.7

U. S. Department of Labor.

Metalworking Machinery

	EARNINGS (Hourly avg)		HOURS (Weekly avg)	
	1960	1959	1960	1959
Jan.	$2.75	$2.62	43.4	40.8
Feb.	2.77	2.66	43.5	41.5
Mar.	2.80	2.68	44.2	42.0
Apr.	2.78	2.70	43.3	42.5
May	2.81	2.71	43.9	42.6
June	2.81	2.70	43.5	42.9
July	2.79	2.69	42.4	42.5
Aug.	2.71	2.67	40.9	42.4
Sept.	2.70	2.68	40.6	42.2
Oct.	2.72	2.70	40.9	42.6
Nov.	2.73	2.71	40.2	42.7
Dec.	...	2.73	...	43.4

Electrical Appliances

	1960	1959	1960	1959
Jan.	$2.31	$2.25	39.4	39.8
Feb.	2.33	2.25	39.4	38.8
Mar.	2.33	2.26	39.1	39.3
Apr.	2.31	2.25	38.6	39.3
May	2.33	2.25	39.4	38.9
June	2.31	2.26	39.5	39.5
July	2.30	2.26	39.4	39.4
Aug.	2.29	2.24	39.3	39.5
Sept.	2.30	2.27	39.1	39.5
Oct.	2.30	2.27	40.0	40.3
Nov.	2.31	2.25	39.0	39.8
Dec.	...	2.27	...	40.1

Motor Vehicles and Equipment

	1960	1959	1960	1959
Jan.	$2.84	$2.66	43.7	41.0
Feb.	2.81	2.66	41.5	40.2
Mar.	2.79	2.67	40.8	41.0
Apr.	2.74	2.67	39.5	41.7
May	2.77	2.68	41.1	41.7
June	2.78	2.68	40.6	41.5
July	2.78	2.69	40.0	41.3
Aug.	2.80	2.74	38.8	40.2
Sept.	2.87	2.78	40.6	40.1
Oct.	2.87	2.75	41.8	41.1
Nov.	2.83	2.68	40.2	38.2
Dec.	...	2.77	...	40.9

Aircraft and Parts

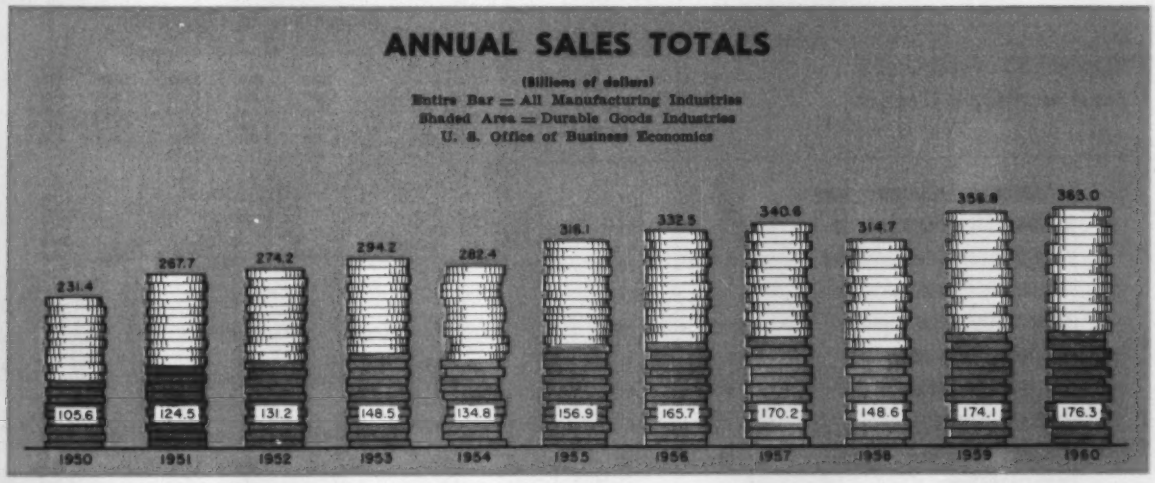
	1960	1959	1960	1959
Jan.	$2.67	$2.58	40.6	40.9
Feb.	2.68	2.59	40.6	40.8
Mar.	2.68	2.58	40.8	40.7
Apr.	2.67	2.59	40.1	40.8
May	2.69	2.61	41.0	40.5
June	2.71	2.64	40.8	40.9
July	2.70	2.63	41.1	40.6
Aug.	2.71	2.64	40.9	40.6
Sept.	2.74	2.65	40.6	40.4
Oct.	2.73	2.66	41.0	40.7
Nov.	2.74	2.66	41.0	40.6
Dec.	...	2.68	...	41.0

Business Conditions

METALWORKING FACTS AND FIGURES

ANNUAL SALES TOTALS

(Billions of dollars)
Entire Bar = All Manufacturing Industries
Shaded Area = Durable Goods Industries
U. S. Office of Business Economics



Manufacturers' Sales

(Shipments, seasonally adjusted—value in millions)

1960	All Manufacturers	Total Durables	Primary Metals	Fab. Metal Products	Machinery	Transport. Equip.	Other Durables†
Jan.	$31,110	$15,450	$2,730	$1,700	$4,800	$3,470	$2,750
Feb.	31,580	15,670	2,690	1,720	4,840	3,570	2,850
Mar.	30,840	15,170	2,540	1,690	4,750	3,460	2,730
Apr.	31,030	15,000	2,310	1,690	4,830	3,360	2,810
May	30,990	15,060	2,240	1,750	4,780	3,490	2,800
June	30,780	14,880	2,010	1,760	4,740	3,600	2,770
July	30,440	14,730	2,110	1,730	4,770	3,410	2,710
Aug.	30,150	14,420	1,980	1,700	4,700	3,350	2,690
Sept.	30,090	14,410	1,920	1,650	4,660	3,570	2,610
Oct.	29,600	14,080	1,790	1,530	4,590	3,630	2,540
Nov.	29,250	13,810	1,790	1,570	4,610	3,300	2,540
Dec.	29,140	13,620	1,750	1,580	4,580	3,150	2,560
MONTHLY AVERAGES							
1960	$30,4[illegible]	[illegible]	$2,155	$1,673	$4,721	$3,447	$2,697
1959	29,73[illegible]	[illegible]	2,214	1,677	4,512	3,292	2,813
1958	26,229	12,383	1,912	1,440	3,831	2,722	2,478
1957	28,383	13,159	2,321	1,537	4,243	3,333	2,725
1956	27,711	13,505	2,362	1,474	3,988	3,003	2,978
1955	26,341	13,079	2,206	1,356	3,449	3,200	2,868
1954	23,530	11,237	1,676	1,226	3,208	2,635	2,492
1953	24,515	12,375	1,987	1,267	3,470	3,086	2,565

†Includes ordnance, professional and scientific instruments, lumber, furniture, stone, clay and glass, and miscellaneous industries.
U. S. Office of Business Economics.

Manufacturers' New Orders

(Seasonally adjusted—value in millions)

1960	All Manufacturers	Total Durables	Primary Metals	Fab. Metal Products	Machinery	Transport. Equip.	Other Durables†
Jan.	$29,830	$14,190	$2,230	$1,610	$4,630	$3,150	$2,570
Feb.	30,590	14,800	2,200	1,610	4,840	3,500	2,650
Mar.	30,290	14,640	1,720	1,640	4,740	3,680	2,860
Apr.	30,350	14,470	1,810	1,710	4,760	3,490	2,700
May	30,470	14,680	1,960	1,700	4,750	3,520	2,750
June	30,110	14,340	1,780	1,680	4,690	3,460	2,730
July	29,190	13,840	1,890	1,590	4,520	3,200	2,640
Aug.	30,010	14,410	1,840	1,740	4,810	3,330	2,690
Sept.	30,400	14,620	1,850	1,540	4,750	3,820	2,660
Oct.	29,210	13,740	1,640	1,480	4,400	3,690	2,530
Nov.	29,020	13,600	1,750	1,560	4,590	3,060	2,640
Dec.	28,700	13,220	1,770	1,460	4,670	2,830	2,490
MONTHLY AVERAGES							
1960	$29,848	$14,213	$1,870	$1,610	$4,679	$3,394	$2,659
1959	30,128	14,851	2,415	1,699	4,660	3,227	2,850
1958	25,904	12,040	1,875	1,404	3,739	2,534	2,486
1957	27,257	13,085	2,125	1,450	3,996	2,847	2,666
1956	28,324	14,442	2,419	1,511	4,237	3,296	2,979
1955	27,171	13,853	2,462	1,424	3,731	3,342	2,894
1954	22,480	10,156	1,560	1,124	2,737	2,291	2,444
1953	23,111	11,032	1,754	1,152	3,138	2,489	2,500

†Includes ordnance, professional and scientifi instruments, lumber, furniture, stone, clay and glass, and miscellaneous industries.
U. S. Office of Business Economics.

Manufacturers' Inventories

(Seasonally adjusted at end of month—value in millions)

1960	All Manufacturers	Total Durables	Primary Metals	Fab. Metal Products	Machinery	Transport. Equip.	Other Durables†
Jan.	$53,310	$30,760	$4,200	$3,130	$10,180	$7,380	$5,870
Feb.	53,900	31,260	4,320	3,230	10,320	7,530	5,860
Mar.	54,340	31,770	4,450	3,330	10,480	7,640	5,870
Apr.	54,660	31,920	4,630	3,320	10,530	7,580	5,860
May	54,950	32,070	4,700	3,350	10,600	7,520	5,900
June	55,100	32,230	4,800	3,340	10,640	7,460	5,990
July	54,900	32,050	4,750	3,330	10,580	7,340	6,050
Aug.	54,980	32,080	4,710	3,340	10,590	7,360	6,080
Sept.	54,710	31,840	4,640	3,270	10,530	7,240	6,160
Oct.	54,380	31,430	4,570	3,180	10,440	7,100	6,140
Nov.	54,010	31,070	4,520	3,100	10,350	7,020	6,080
Dec.	53,640	30,790	4,500	3,090	10,350	6,840	6,010
YEAREND INVENTORIES							
1960	$53,640	$30,790	$4,500	$3,090	$10,350	$6,840	$6,010
1959	51,345	29,481	4,132	3,143	9,556	7,056	5,594
1958	49,468	27,873	4,297	2,810	8,852	6,639	5,275
1957	53,688	31,137	4,466	2,963	10,283	7,885	5,540
1956	52,515	30,591	4,119	3,056	10,316	7,714	5,386
1955	46,672	26,609	3,546	2,692	8,658	6,849	4,864
1954	43,310	24,133	3,245	2,378	7,923	6,047	4,540
1953	45,736	26,272	3,513	2,634	8,796	6,567	4,762

†Includes ordnance, professional and scientific instruments, lumber, furniture, stone, clay and glass, and miscellaneous industries.
U. S. Office of Business Economics.

Manufacturers' Backlogs

(End of month—value in millions)

1960	All Manufacturers	Total Durables	Primary Metals	Fab. Metal Products	Machinery	Transport. Equip.	Other Durables†
Jan.	$50,850	$47,460	$6,390	$3,310	$17,810	$15,380	$4,570
Feb.	50,210	46,910	6,180	3,270	17,920	14,960	4,580
Mar.	49,490	46,280	5,270	3,200	17,980	15,160	4,670
Apr.	48,380	45,230	4,640	3,200	17,970	14,800	4,620
May	47,750	44,590	4,380	3,180	17,910	14,550	4,570
June	47,680	44,500	4,030	3,080	18,120	14,690	4,580
July	47,690	44,620	3,920	3,100	18,260	14,600	4,740
Aug.	47,500	44,640	3,740	3,100	18,240	14,890	4,670
Sept.	47,450	44,680	3,670	3,000	18,250	15,160	4,600
Oct.	46,440	43,770	3,500	2,940	17,940	14,930	4,460
Nov.	45,800	43,230	3,470	2,860	17,620	14,830	4,450
Dec.	45,370	42,850	3,410	2,730	17,480	14,930	4,300
YEAREND BACKLOGS							
1960	$45,370	$42,850	$3,410	$2,730	$17,480	$14,930	$4,300
1959	50,405	47,181	5,870	3,267	17,305	15,960	4,779
1958	46,797	44,008	4,351	3,060	16,012	16,504	4,081
1957	50,697	48,127	4,796	3,483	17,120	18,750	3,978
1956	64,210	61,015	7,144	4,526	20,083	24,584	4,678
1955	56,861	53,372	6,455	4,077	17,092	21,072	4,676
1954	46,900	44,081	3,381	3,268	13,706	19,372	4,352
1953	59,496	57,060	4,766	4,497	19,365	23,490	4,942

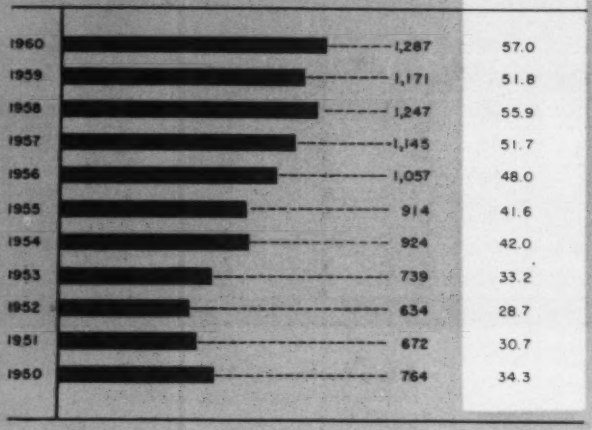
†Includes ordnance, professional and scientific instruments, lumber, furniture, stone, clay and glass, and miscellaneous industries.
U. S. Office of Business Economics.

Trade

METALWORKING FACTS AND FIGURES

BUSINESS FAILURES

Total Monthly Averages



	ANNUAL RATE OF FAILURES†
1960	57.0
1959	51.8
1958	55.9
1957	51.7
1956	48.0
1955	41.6
1954	42.0
1953	33.2
1952	28.7
1951	30.7
1950	34.3

	Failures			Liabilities	
	Totals	Mfg., Mining	Construction	Mfg., Mining	Construction
1960					
January	1,181	210	193	$16,324,000	$11,993,000
February	1,214	198	195	21,527,000	10,770,000
March	1,335	224	241	19,170,000	19,427,000
April	1,370	215	220	18,483,000	13,661,000
May	1,273	229	214	31,963,000	10,877,000
June	1,334	228	213	41,111,000	18,613,000
July	1,148	173	192	21,080,000	11,073,000
August	1,315	225	217	33,097,000	27,874,000
September	1,289	218	218	23,011,000	14,417,000
October	1,344	229	231	16,104,000	17,877,000
November	1,311	231	228	28,887,000	16,683,000
December	1,353	231	245	18,878,000	28,104,000
MONTHLY AVERAGES					
1960	1,257	218	214	$24,136,300	$16,780,800
1959	1,171	205	172	17,311,300	10,156,900
1958	1,247	223	180	20,466,500	9,592,900
1957	1,145	201	175	16,403,400	9,192,700
1956	1,057	190	153	15,935,833	8,400,250
1955	914	184	117	13,078,750	6,931,583
1954	924	190	109	14,273,667	4,735,750
1953	739	155	85	13,237,833	3,610,583
1952	634	132	70	8,746,167	3,012,083
1951	672	128	80	7,581,000	3,123,000
1950	764	173	76	7,925,000	2,138,000

†Apparent number of failures per 10,000 listed enterprises.
Dun & Bradstreet Inc.

Businesses in Operation

(Seasonally adjusted—thousands)

	1960	1959	1958	1957	1956
1st Qtr	4,690	4,615	4,555	4,500	4,420
2nd Qtr	4,710	4,635	4,565	4,520	4,445
3rd Qtr	4,725	4,655	4,580	4,535	4,465
4th Qtr	4,730	4,670	4,595	4,545	4,485

YEARLY TOTALS†

(Thousands)

	All Industries	Construction	Manufacturing	Services
1960	4,659	473	326	873
1959	4,583	464	323	848
1958	4,533	466	329	828
1957	4,471	465	332	810
1956	4,381	452	327	790

†On Jan. 1 of each year.
U. S. Office of Business Economics.

New Business Incorporations

	1960	1959	1958	1957	1956
January	18,189	18,842	13,140	13,439	13,407
February	14,669	15,791	10,497	10,825	12,534
March	17,437	18,176	11,705	12,080	12,850
April	15,446	17,615	11,380	12,349	12,513
May	15,530	16,721	11,987	12,260	13,176
June	16,676	16,208	12,032	11,306	11,983
July	14,676	16,650	12,504	11,717	11,539
August	14,993	14,406	12,280	11,398	11,365
September	14,007	14,664	12,958	10,556	9,627
October	13,760	14,526	13,669	11,282	11,578
November	12,412	13,015	12,117	9,302	9,773
December	14,579	16,456	16,512	10,598	10,818
Totals	182,374	193,070	150,781	137,112	141,163
Monthly Avg	15,198	16,089	12,565	11,426	11,764

Dun & Bradstreet Inc.

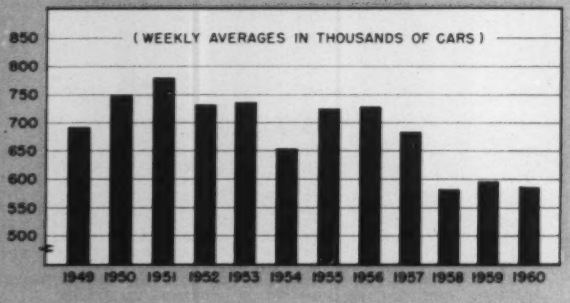
Foreign Trade

(Value in millions)

	Merchandise Exports†			General Imports		
	1960	1959	1958	1960	1959	1958
Jan.	$1,561.8	$1,400.4	$1,504.6	$1,137.4	$1,154.2	$1,095.9
Feb.	1,576.1	1,280.2	1,344.9	1,287.8	1,118.1	956.4
Mar.	1,751.2	1,456.3	1,552.7	1,375.3	1,300.9	1,071.0
Apr.	1,822.9	1,468.0	1,529.8	1,257.4	1,220.9	1,056.8
May	1,809.5	1,551.8	1,638.0	1,259.5	1,263.8	1,060.9
June	1,738.1	1,425.7	1,406.3	1,313.0	1,369.4	1,031.3
July	1,699.3	1,468.6	1,415.6	1,155.0	1,248.4	1,049.1
Aug.	1,612.7	1,396.7	1,396.4	1,228.1	1,189.8	950.2
Sept.	1,610.1	1,479.0	1,360.9	1,160.3	1,391.8	1,074.0
Oct.	1,743.9	1,476.2	1,598.9	1,157.2	1,204.8	1,141.8
Nov.	1,796.7	1,478.6	1,596.2	1,160.8	1,282.2	1,089.0
Dec.	1,796.6	1,674.5	1,513.6	1,157.1	1,466.9	1,253.4

†Including re-exports.
U. S. Bureau of the Census.

FREIGHT CARLOADINGS



1960—By Weeks

(Cars loaded with revenue freight)

Jan. 2	483,012	May 7	641,703	Sept. 3	577,090
Jan. 9	591,515	May 14	639,954	Sept. 10	481,057
Jan. 16	605,757	May 21	636,808	Sept. 17	598,716
Jan. 23	587,339	May 28	640,388	Sept. 24	617,835
Jan. 30	601,900	June 4	574,301	Oct. 1	631,645
Feb. 6	587,933	June 11	648,463	Oct. 8	646,016
Feb. 13	580,103	June 18	649,830	Oct. 15	653,145
Feb. 20	571,625	June 25	641,628	Oct. 22	637,311
Feb. 27	553,153	July 2	549,416	Oct. 29	620,712
Mar. 5	557,607	July 9	456,330	Nov. 5	599,493
Mar. 12	560,230	July 16	607,081	Nov. 12	564,590
Mar. 19	581,477	July 23	619,784	Nov. 19	587,299
Mar. 26	600,926	July 30	614,236	Nov. 26	471,400
Apr. 2	598,031	Aug. 6	594,329	Dec. 3	522,936
Apr. 9	598,384	Aug. 13	599,908	Dec. 10	517,653
Apr. 16	622,635	Aug. 20	596,339	Dec. 17	486,059
Apr. 23	625,374	Aug. 27	594,770	Dec. 24	467,978
Apr. 30	643,271			Dec. 31	406,348

Association of American Railroads.

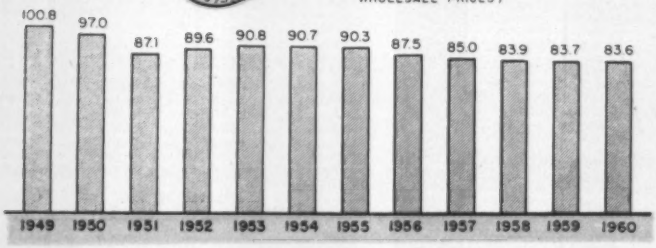
Finance

METALWORKING FACTS AND FIGURES

PURCHASING POWER OF THE DOLLAR

(1947-49=100)

(MONTHLY AVERAGES IN CENTS AS MEASURED BY WHOLESALE PRICES)



AS MEASURED BY:	Wholesale Prices	Consumers' Prices
1960		
Jan.	83.8	79.7
Feb.	83.8	79.6
Mar.	83.3	79.6
Apr.	83.3	79.2
May	83.5	79.2
June	83.7	79.1
July	83.5	79.0
Aug.	83.9	79.0
Sept.	83.9	78.9
Oct.	83.6	78.6
Nov.	83.6	78.5
Dec.	83.7	78.4
Monthly Averages		
1960	83.6	79.1
1959	83.7	80.3
1958	83.9	81.0
1957	85.0	83.2
1956	87.5	86.1
1955	90.3	87.3
1954	90.7	87.1
1953	90.8	87.4
1952	89.6	88.1
1951	87.1	90.1
1950	97.0	97.3

U. S. Office of Business Economics.

National Income

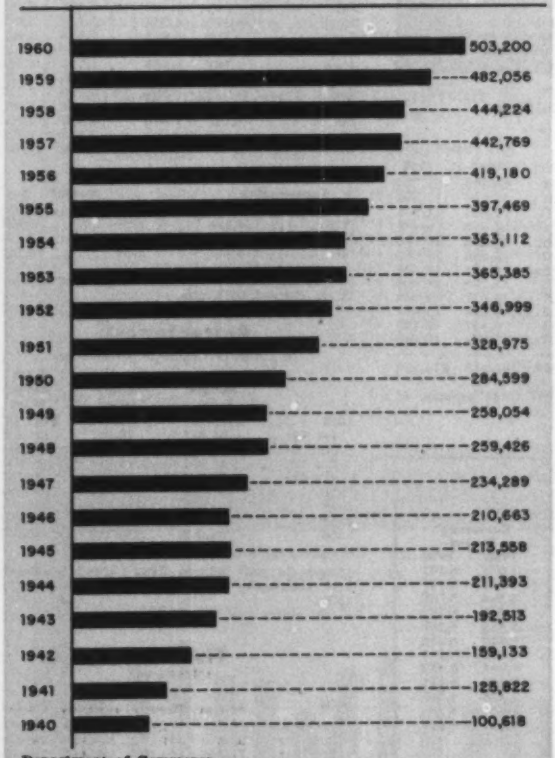
(Millions)

1960*	$418,000
1959	399,648
1958	367,686
1957	366,943
1956	350,836
1955	330,206
1954	301,794
1953	305,573
1952	292,155
1951	279,313
1950	241,876
1949	217,690
1948	223,487
1947	198,177
1946	180,879
1945	181,248
1944	182,639
1943	170,310
1942	137,694
1941	104,710
1940	81,634
1939	72,753

*Estimated. Department of Commerce.

GROSS NATIONAL PRODUCT

(Millions of dollars)



Department of Commerce.

U. S. Revenues, Expenditures, Debt

Fiscal Year	Net Receipts (Millions)	Per Capita Receipts	Expenditures (Millions)	Per Capita Expenditures	Gross Debt (Millions)	Per Capita Debt
1960	$77,798	$431.16	$76,573	$424.37	$286,331	$1,804.39
1959	68,270	386.00	80,696	456.26	284,706	1,609.74
1958	69,116	397.63	71,937	413.85	276,343	1,589.80
1957	71,031	415.43	69,433	406.09	270,527	1,582.21
1956	68,165	406.09	66,539	396.40	272,751	1,624.89
1955	60,389	365.89	64,568	391.21	274,374	1,662.41
1954	64,654	398.64	67,722	417.86	271,260	1,672.51
1953	64,596	405.19	73,985	464.08	266,071	1,668.10
1952	62,129	396.31	66,146	421.93	259,105	1,652.77
1951	48,142	312.36	44,632	289.59	255,222	1,655.97
1950	37,043	244.42	40,167	265.03	257,357	1,698.13
1949	38,246	256.68	40,057	268.83	252,770	1,696.44
1948	44,746	306.24	36,326	248.61	252,292	1,726.68
1947	44,703	311.77	42,505	296.44	258,376	1,801.94
1946	43,037	305.25	65,018	461.17	269,422	1,910.97
1945	46,456	332.78	100,404	719.25	258,682	1,853.01
1944	44,149	319.92	93,743	679.29	201,003	1,455.52
1943	22,281	163.25	78,182	572.83	136,696	1,001.55
1942	12,799	95.25	32,491	241.80	72,422	537.35
1941	7,607	57.29	12,774	74.16	48,961	367.54
1940	5,387	44.09	9,127	70.65	42,967	325.63
1939	5,164	43.21	8,765	70.65	40,445	308.34
1938	5,854	47.89	7,304	59.70	37,167	285.43
1937	5,028	40.93	8,281	62.69	36,427	281.82
1936	4,115	32.17	9,068	69.41	33,545	261.20
1935	3,800	29.88	7,583	58.00	28,701	225.07
1934	3,115	24.64	6,370	56.19	27,053	213.65
1933	2,079	16.54	4,325	40.91	22,538	179.21
1932	2,005	16.06	4,948	41.28	19,487	155.93
1931	3,190	25.70	4,091	32.99	16,801	135.37
1930	4,177	33.01	3,994	32.42	16,185	131.49
1929	4,033	33.19	3,848	31.67	16,931	139.40
1928	4,042	33.73	3,643	30.40	17,604	146.69
1927	4,129	34.94	3,493	29.56	18,510	156.04
1926	3,962	33.98	3,584	30.76	19,643	167.70
1925	3,780	32.91	3,529	30.73	20,516	177.82

Annual Statements of the Treasury.

Corporate Income, Taxes, Dividends

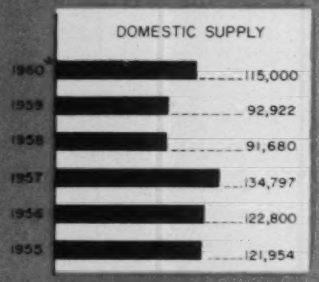
(All industries in millions)

	Income Before Taxes	Taxes†	Income After Taxes	Cash Dividend Payments	Undistributed Income
1960§					
1st Qtr.	$48,800	$23,800	$25,000	$13,900	$11,000
2nd Qtr.	45,700	22,300	23,400	13,900	9,500
3rd Qtr.	41,500	20,300	21,300	14,000	7,300
1959	47,021	23,196	23,825	13,363	10,462
1958	37,698	18,614	19,084	12,364	6,720
1957	43,208	20,922	22,286	12,588	9,698
1956	44,683	21,227	23,456	12,132	11,324
1955	44,862	21,827	23,035	11,215	11,820
1954	34,061	17,220	16,841	9,839	7,002
1953	38,311	20,222	18,089	9,225	8,864
1952	36,691	19,459	17,232	8,954	8,278

†Federal and state corporate income and excess profits tax liability.
§Seasonally adjusted annual rates.
Department of Commerce.

Iron Ore Supply

(Thousands of gross tons)



Exclusive of stocks on hand

(Gross tons)

	U. S. Mine Production†	Imports for Consumption†	Exports	Total Domestic Supply
1960*	.....	.....	.....	115,000,000
Jan.	4,037,000	2,370,275	70,000	6,337,275
Feb.	4,012,000	2,515,201	35,000	6,492,201
Mar.	4,497,000	2,216,801	100,000	6,613,801
Apr.	7,433,000	2,333,712	169,000	9,597,712
May	11,794,000	3,715,606	558,000	14,951,606
June	11,858,000	4,210,499	824,000	15,244,499
July	10,283,000	3,745,252	788,000	13,240,252
Aug.	10,892,000	4,298,130	1,162,000	14,402,130
Sept.	8,764,000	3,069,145	848,000	10,985,145
Oct.	6,275,000	2,592,981	467,000	8,400,981
Nov.	3,874,000	2,010,144	127,000	5,757,144
Dec.	.....	.....	.....	.....
1959	80,276,000	35,613,000	2,987,000	92,922,000
1958	67,709,000	27,544,000	3,573,000	91,680,000

*Estimated.
†Exclusive of manganiferous ore.
U. S. Bureau of Mines.

Iron Ore Stocks†

(At furnaces and docks in U. S.; gross tons)

	1960	1959
January	55,976,461	55,600,521
February	48,396,749	51,702,279
March	40,457,234	43,973,305
April	37,343,966	36,365,046
May	43,255,438	41,022,509
June	51,786,707	47,791,872
July	61,217,816	53,462,629
August	68,901,450	56,792,839
September	74,129,653	60,532,579
October	77,672,317	62,982,548
November	77,104,734	66,876,542
December	73,954,554	64,516,011

†At end of month.
American Iron Ore Association and American Iron & Steel Institute.

Iron Ore Consumption in U. S.†

(Gross tons)

	1960	1959
January	11,855,949	9,831,641
February	11,337,345	9,706,718
March	11,788,224	11,512,241
April	10,432,815	11,539,631
May	9,740,404	11,848,410
June	8,069,541	11,131,356
July	7,014,496	5,632,477
August	6,728,535	1,506,400
September	6,356,018	1,464,187
October	6,694,281	1,592,655
November	6,361,612	7,091,068
December	5,894,698	11,539,231

†Includes ore agglomerates.
American Iron Ore Association and American Iron & Steel Institute.

Lake Superior Iron Ore

(Shipments from Upper Lake ports; gross tons)

	1960	1959	1958
Jan.	none	none	none
Feb.	none	none	none
Mar.	none	none	none
Apr.	5,598,862	2,910,070	62,560
May	11,884,477	12,143,711	3,935,749
June	11,326,411	12,407,625	7,801,699
July	11,277,096	6,431,100	9,187,770
Aug.	9,358,940	222,722	8,920,039
Sept.	7,877,142	85,172	8,368,731
Oct.	6,676,116	273,344	8,043,664
Nov.	1,874,808	5,065,942	4,281,562
Dec.	none	3,125,695	61,317

American Iron Ore Association.

Ferrous Scrap

(Gross tons)

	Exports 1960	Exports 1959	Imports 1960	Imports 1959
Jan.	317,875	197,264	10,593	15,060
Feb.	409,565	239,284	13,046	17,903
Mar.	491,961	254,356	14,500	21,141
Apr.	459,134	269,014	16,989	19,484
May	591,312	375,164	12,609	30,593
June	541,171	365,502	15,538	31,065
July	448,414	442,469	16,454	24,636
Aug.	768,939	492,478	13,230	31,000
Sept.	585,089	380,827	13,637	14,534
Oct.	609,741	380,743	10,413	15,914
Nov.	654,552	445,313	9,857	39,122
Dec.	509,565	516,907	15,379	15,843
Totals	6,412,121*	4,335,789*	162,245	276,295

*Monthly data do not equal total because of unreported revisions.
U. S. Bureau of Mines.

Ferrous Scrap Consumption & Stocks

(Thousands of gross tons)

	Makers of Steel Ingots & Castings[1] 1960	Makers of Steel Ingots & Castings[1] 1959	Makers of Steel Castings[2] 1960	Makers of Steel Castings[2] 1959	Iron Foundries & Misc. 1960	Iron Foundries & Misc. 1959	Totals† 1960	Totals† 1959	Consumers' Stocks‡ 1960	Consumers' Stocks‡ 1959
Jan.	5,954	4,352	221	201	868	822	7,043	5,375	8,518	8,331
Feb.	5,404	4,612	228	211	862	835	6,494	5,658	8,522	8,197
Mar.	5,503	5,505	252	248	900	925	6,656	6,677	8,284	8,243
Apr.	4,615	5,410	219	261	792	974	5,626	6,645	8,277	8,276
May	4,031	5,469	219	256	801	918	5,051	6,643	8,460	8,199
June	3,387	5,132	226	264	846	927	4,459	6,322	8,626	8,215
July	2,902	2,591	141	199	635	795	3,678	3,585	8,661	8,312
Aug.	3,301	912	189	201	728	761	4,218	1,875	8,598	8,473
Sept.	3,189	1,018	194	220	766	875	4,149	2,114	8,495	8,611
Oct.	3,418	1,167	182	223	776	876	4,376	2,267	8,494	8,791
Nov.	3,017	3,906	181	205	742	684	3,940	4,797	8,457	8,864
Dec.	2,865	5,919	184	237	690	865	3,739	7,022	8,261	8,938

[1]Includes only those castings made by companies producing steel ingots.
[2]Excludes companies that produce both steel castings and steel ingots.
†Totals are not precise because of rounded figures.
‡At end of month.
U. S. Bureau of Mines.

Coke Production

(Net tons)

	Oven	Beehive	Totals
1960	56,043,110	950,159	56,993,269
Jan.	6,186,585	116,697	6,303,282
Feb.	5,912,498	128,801	6,041,299
Mar.	6,243,212	134,463	6,377,675
Apr.	5,653,858	101,860	5,755,718
May	5,271,154	78,662	5,349,816
June	4,542,560	54,921	4,597,481
July	3,975,089	50,383	4,025,472
Aug.	3,923,408	72,439	3,995,847
Sept.	3,591,515	57,884	3,649,399
Oct.	3,879,436	51,614	3,931,050
Nov.	3,487,070	50,610	3,537,680
Dec.	3,376,725	51,825	3,428,550
1959	54,676,367	1,089,081	55,765,448
Jan.	5,532,755	81,778	5,614,533
Feb.	5,436,617	91,730	5,528,347
Mar.	6,262,234	141,137	6,403,371
Apr.	6,074,002	161,978	6,235,980
May	6,243,859	143,458	6,387,317
June	5,945,500	120,300	6,065,800
July	3,498,100	66,100	3,564,200
Aug.	1,788,800	49,900	1,838,700
Sept.	1,738,900	36,300	1,775,200
Oct.	1,800,700	37,900	1,838,600
Nov.	4,284,000	66,100	4,350,100
Dec.	6,070,900	92,400	6,163,300

YEARLY TOTALS

	Oven	Beehive	Totals
1958	52,915,265	566,546	53,481,811
1957	73,860,692	2,090,029	75,950,721
1956	71,992,242	2,462,022	74,454,264

U. S. Bureau of Mines.

Pig Iron

(Thousands of gross tons)

	Consumption 1960	Consumption 1959	Stocks† 1960	Stocks† 1959
Jan.	7,016	5,610	2,649	3,478
Feb.	6,600	5,628	2,655	3,296
Mar.	6,870	6,798	2,724	3,172
Apr.	5,853	6,653	2,919	3,095
May	5,467	6,868	3,158	3,118
June	4,692	6,586	3,253	3,064
July	3,933	3,193	3,355	3,132
Aug.	4,122	896	3,300	3,122
Sept.	3,816	971	3,230	3,058
Oct.	4,018	1,046	3,267	3,004
Nov.	3,675	3,999	3,313	2,725
Dec.	3,427	6,906	3,366	2,650

MONTHLY AVERAGES

Consumption		Stocks†	
1960	4,957	1960	3,099
1959	4,596	1959	3,077
1958	4,261	1958	3,464
1957	5,682	1957	2,717

†Including suppliers' stocks at end of month.
U. S. Bureau of Mines.

Refractories†

(Shipments—value in thousands)

	Clay Refractories	Nonclay Refractories	Total Refractories
1960	$178,998	$232,449	$411,447
1st Qtr	51,621	75,037	126,658
2nd Qtr	46,679	62,230	108,909
3rd Qtr	42,357	49,916	92,273
4th Qtr	38,341	45,266	83,607
1959	178,522	225,024	403,546
1958	162,887	216,668	379,555
1957	207,640	253,668	461,308
1956	206,608	210,102	418,710

†Data do not include dead-burned magnesia and magnesite or dead-burned dolomite for 1956.
U. S. Bureau of the Census.

Fluorspar

(Net tons)

	Production	Imports	Consumption	Stocks†
1960				
1st Qtr.	46,464	111,636	177,039	187,970
2nd Qtr.	53,610	144,226	155,131	190,660
3rd Qtr.	71,266	146,428	167,416	230,234
1959	195,100	555,750	589,979	201,188
1958	310,600	392,164	494,227	203,968
1957	322,600	631,367	644,688	245,319

U. S. Bureau of Mines. †End of period.

Fuel-Power-Raw Materials

METALWORKING FACTS AND FIGURES

U. S. Electricity Production Capacity†

(Thousands of kilowatts)

1960			
January	157,013	July	162,827
February	158,217	August	164,285
March	158,728	September	164,511
April	159,703	October	165,714
May	161,280	November	166,314
June	162,070	December	167,477

CAPACITIES AT YEAREND

1960	167,477	1956	120,697	1952	82,226
1959	156,622	1955	114,472	1951	75,775
1958	142,597	1954	102,592	1950	68,919
1957	129,123	1953	91,502	1949	63,100

†Total electric utility industry.
Edison Electric Institute.

Fuel Oil Consumption in Steel Industry

(Thousands of gallons)

	Melting Furnaces	Heating, Annealing etc.	Totals
1959	1,130,486	607,196	1,737,682
1958	998,150	609,339	1,607,489
1957	1,320,545	644,698	1,965,243
1956	1,540,834	720,795	2,261,629
1955	1,584,752	693,090	2,277,842
1954	1,239,305	558,989	1,798,294

American Iron & Steel Institute.

Liquefied Petroleum Gas Consumption in Steel Industry

(Gallons)

	Heating and Annealing	All Other	Totals
1959	5,175,479	3,464,333	8,639,812
1958	4,861,425	3,551,784	8,413,209
1957	8,761,323	2,537,219	11,298,542
1956	9,157,271	2,452,896	11,610,167

American Iron & Steel Institute.

ELECTRICITY OUTPUT

(Total electric utility industry)
(Millions of kilowatt-hours)

1960—By Weeks

Jan. 2	13,565	May 7	13,139	Sept. 3	14,941
Jan. 9	14,308	May 14	13,350	Sept. 10	14,216
Jan. 16	14,236	May 21	13,466	Sept. 17	13,903
Jan. 23	14,523	May 28	13,572	Sept. 24	14,156
Jan. 30	14,313	June 4	13,134	Oct. 1	13,779
Feb. 6	14,097	June 11	13,766	Oct. 8	13,725
Feb. 13	14,071	June 18	14,053	Oct. 15	13,736
Feb. 20	14,226	June 25	14,213	Oct. 22	13,805
Feb. 27	14,092	July 2	14,247	Oct. 29	13,883
Mar. 5	14,262	July 9	13,031	Nov. 5	13,982
Mar. 12	14,271	July 16	14,208	Nov. 12	14,111
Mar. 19	14,100	July 23	14,425	Nov. 19	14,042
Mar. 26	13,951	July 30	14,746	Nov. 26	13,500
Apr. 2	13,542	Aug. 6	14,709	Dec. 3	14,368
Apr. 9	13,494	Aug. 13	14,622	Dec. 10	14,604
Apr. 16	13,263	Aug. 20	14,453	Dec. 17	15,021
Apr. 23	13,213	Aug. 27	14,602	Dec. 24	15,114
Apr. 30	13,300			Dec. 31	13,956

Edison Electric Institute.

YEARLY TOTALS

(Millions of kilowatt-hours)

1960*	729,851
1959	709,700
1958	645,098
1957	631,507
1956	600,668
1955	547,038
1954	471,686
1953	442,665
1952	399,224
1951	370,673
1950	329,141

*Preliminary.
Federal Power Commission.

Natural Gas Consumption in Steel Industry

(Millions of cubic feet)

	Melting Furnaces	Heating, Annealing	All Other	Totals
1959	63,514	173,727	79,734	316,975
1958	58,409	149,240	71,051	278,700
1957	68,029	154,440	58,665	281,134
1956	60,615	164,057	59,032	283,704
1955	57,640	163,742	52,302	273,684
1954	40,302	128,532	44,869	213,703

American Iron & Steel Institute.

Natural Gas Sales

(Millions of therms)

1960	Residential	Industrial, Commercial	Other	Totals
1st Qtr	13,986	14,918	1,214	30,118
2nd Qtr	6,550	13,570	934	21,054
3rd Qtr	2,523	12,927	836	16,286
1959	28,330	52,740	4,152	85,222
1958	26,336	47,564	3,429	77,329

American Gas Association.

Oxygen Consumption in Steel Industry

(Millions of cubic feet)

	Purchased	Own Manufacture	Totals
1959	25,242	9,211	34,453
1958	19,015	9,819	28,834
1957	17,106	8,781	25,887

American Iron & Steel Institute.

Bituminous Coal Consumption & Production

(Thousands of net tons)

	Industrial Consumption†		Mfg., Mining Consumption		Production	
	1960	1959	1960	1959	1960	1959
Jan.	38,115	36,685	17,962	16,394	36,110	36,485
Feb.	36,518	33,253	17,266	15,393	34,670	34,273
Mar.	39,156	34,757	18,532	17,265	38,860	35,396
Apr.	30,853	30,937	15,747	16,364	34,740	35,096
May	29,707	30,254	14,941	16,175	35,990	35,495
June	27,983	29,923	13,424	15,305	33,325	36,775
July	26,587	26,131	11,878	11,233	25,250	24,377
Aug.	28,824	24,591	12,282	8,927	36,470	30,088
Sept.	34,440	24,374	11,590	8,880	34,440	32,571
Oct.	30,159	26,244	12,929	9,680	35,240	34,921
Nov.	30,537	32,133	12,905	14,426	33,380	35,997
Dec.	34,434	36,974	13,625	17,719	31,885	40,554

†Includes retail deliveries.
U. S. Office of Business Economics.

Monthly Averages

	Industrial Consumption	Mfg., Mining Consumption	Production
1960	32,276	14,426	34,197
1959	30,521	13,979	34,336
1958	30,408	14,458	33,750
1957	34,472	17,566	41,059
1956	36,072	17,953	41,740
1955	35,284	17,739	38,719
1954	30,255	14,784	32,642
1953	35,567	18,747	38,108
1952	34,896	17,399	38,903

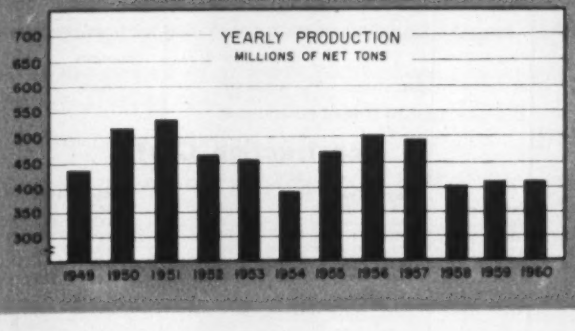
Bituminous Coal Stocks

(Industrial and retail dealers;
Thousands of net tons at end of month)

	1960	1959		1960	1959
Jan.	73,426	71,203	July	70,235	65,374
Feb.	70,640	69,167	Aug.	72,662	66,596
Mar.	66,955	65,868	Sept.	74,458	68,732
Apr.	68,153	65,739	Oct.	76,206	72,663
May	71,364	67,659	Nov.	76,730	74,653
June	73,928	70,369	Dec.	73,230	76,202

U. S. Bureau of Mines.

BITUMINOUS COAL OUTPUT



1960—By Weeks
(Thousands of net tons)

Jan. 2	7,325	May 7	8,275	Sept. 3	7,730
Jan. 9	9,000	May 14	8,255	Sept. 10	8,000
Jan. 16	8,825	May 21	8,425	Sept. 17	8,205
Jan. 23	8,650	May 28	8,440	Sept. 24	8,220
Jan. 30	8,920	June 4	7,855	Oct. 1	8,255
Feb. 6	8,470	June 11	8,800	Oct. 8	8,120
Feb. 13	8,290	June 18	8,895	Oct. 15	8,525
Feb. 20	7,400	June 25	9,070	Oct. 22	8,535
Feb. 27	8,235	July 2	1,855	Oct. 29	7,990
Mar. 5	7,600	July 9	1,320	Nov. 5	7,925
Mar. 12	7,855	July 16	7,345	Nov. 12	7,320
Mar. 19	8,720	July 23	7,925	Nov. 19	8,045
Mar. 26	8,710	July 30	8,220	Nov. 26	6,390
Apr. 2	7,500	Aug. 6	7,790	Dec. 3	7,325
Apr. 9	8,310	Aug. 13	8,035	Dec. 10	7,475
Apr. 16	8,810	Aug. 20	8,040	Dec. 17	7,335
Apr. 23	8,600	Aug. 27	7,790	Dec. 24	7,550
Apr. 30	8,300			Dec. 31	6,715

U. S. Bureau of Mines; National Coal Association.

Construction

METALWORKING FACTS AND FIGURES

Construction Contract Awards

(Valuation in thousands)

	Residential and Nonresidential		Public Works, Utilities		Totals	
	1960	1959	1960	1959	1960	1959
Jan.	$1,728,368	$1,839,741	$464,581	$479,426	$2,192,949	$2,319,167
Feb.	1,685,078	1,777,414	554,456	529,623	2,239,534	2,307,037
Mar.	2,361,067	2,453,944	685,278	885,990	3,046,345	3,339,934
Apr.	2,527,280	3,017,987	832,502	760,432	3,359,782	3,778,419
May	2,562,548	2,748,844	774,175	793,014	3,336,723	3,541,858
June	2,592,812	2,816,954	879,464	842,063	3,472,276	3,659,017
July	2,481,223	2,880,774	1,115,686	775,763	3,596,909	3,656,537
Aug.	2,609,866	2,512,325	685,351	571,324	3,295,217	3,083,649
Sept.	2,401,787	2,472,259	716,988	585,796	3,118,775	3,058,055
Oct.	2,555,101	2,518,410	764,044	616,090	3,319,145	3,134,500
Nov.	2,168,684	1,893,030	717,447	479,796	2,886,131	2,372,826
Dec.	1,871,931	1,783,423	845,770	440,637	2,717,701	2,224,060
Tot.*	$27,345,123	$28,536,281	$8,972,506	$7,732,263	$36,317,629	$36,268,544

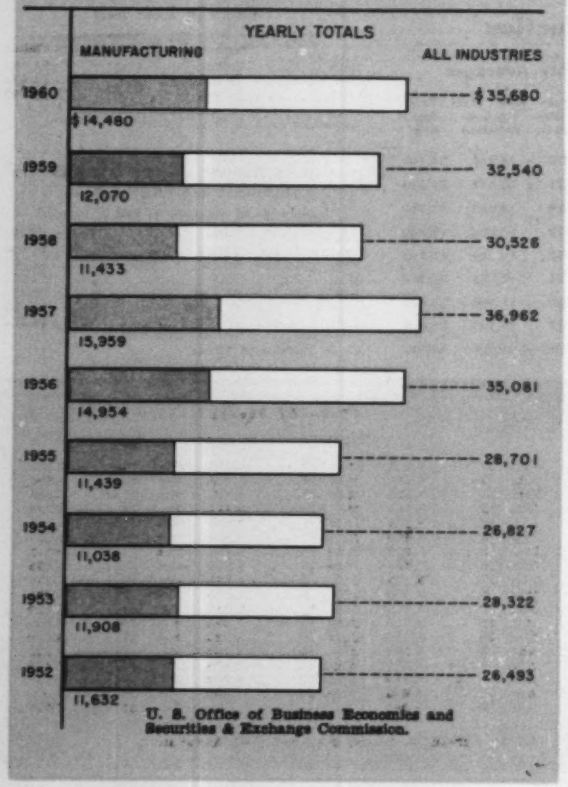
*Monthly data do not equal yearly totals because of unreported revisions.
F. W. Dodge Corp.

NEW PLANT & EQUIPMENT EXPENDITURES

(Millions)

	Manufacturing		All Industries	
	1960	1959	1960	1959
1st Quarter	$3,090	$2,460	$7,890	$6,910
2nd Quarter	3,760	3,020	9,280	8,320
3rd Quarter	3,620	3,020	8,980	8,320
4th Quarter	4,010	3,570	9,530	8,990
Totals	$14,480	$12,070	$35,680	$32,540

U. S. Office of Business Economics and Securities & Exchange Commission.



U. S. Office of Business Economics and Securities & Exchange Commission.

Construction Put in Place

(Valuation in millions)

	Private						
	Nonfarm Residential	Nonresidential	Farm	Public Utility	All Other	Public	Totals
1960							
Jan.	$1,620	$773	$ 99	$355	$22	$ 943	$3,812
Feb.	1,478	781	99	360	19	884	3,621
Mar.	1,600	761	102	395	19	991	3,868
Apr.	1,742	749	107	425	19	1,170	4,212
May	1,920	784	121	462	23	1,383	4,693
June	2,022	833	127	476	25	1,534	5,017
July	2,089	860	134	482	27	1,604	5,196
Aug.	2,050	871	139	489	26	1,682	5,257
Sept.	2,023	889	116	489	26	1,701	5,244
Oct.	1,949	912	106	490	27	1,579	5,063
Nov.	1,879	923	98	463	27	1,420	4,810
Dec.	1,702	896	83	426	23	1,353	4,483
Totals†	$22,024	$10,032	$1,278	$5,312	$283	$16,244	$55,173
1959	24,469	8,859	1,362	5,052	207	16,257	56,206
1958*	18,047	8,675	1,475	5,105	189	15,412	48,903
1957*	17,016	9,552	1,596	5,412	204	14,016	47,796

†Totals may not equal sums of monthly data because of unreported revisions.
*Not exactly comparable with data for 1959 and forward.
U. S. Bureau of the Census.

New Houses Started

	1960			1959		
	Total, Public & Private	Total, Private	Nonfarm, Public & Private	Total, Public & Private	Total, Private	Nonfarm, Public & Private
Jan.	88,400	87,100	84,300	99,200	96,200	98,300
Feb.	90,200	87,900	88,800	100,000	99,000	99,000
Mar.	93,300	90,200	92,300	130,700	127,700	129,400
Apr.	125,200	123,500	123,400	155,900	150,700	154,300
May	130,000	127,300	128,200	156,000	152,500	154,300
June	127,300	122,200	125,700	153,400	147,800	152,100
July	114,900	111,100	113,200	149,700	145,100	146,700
Aug.	129,600	124,800	127,500	142,400	138,200	142,000
Sept.	102,000	96,400	100,000	140,000	136,300	136,100
Oct.	112,200	109,400	109,100	123,300	120,000	121,200
Nov.	96,000	94,300	95,000	106,500	104,700	104,300
Dec.	72,500	65,800	71,900	96,400	95,600	93,600
Totals	1,281,600	1,240,000	1,259,400	1,553,500	1,516,800	1,531,300

YEARLY TOTALS*

	Nonfarm, Public & Private		Nonfarm, Public & Private
1958	1,209,400	1956	1,118,100
1957	1,041,900	1955	1,328,900

*Not exactly comparable with data for 1959 and forward.
U. S. Bureau of the Census.

Fabricated Structural Steel

(Tons)

	Orders Placed			Shipments		
	1960	1959	1958	1960	1959	1958
Jan.	221,222	235,784	162,158	209,031	224,260	316,742
Feb.	288,825	294,367	185,646	240,850	216,127	282,576
Mar.	342,859	254,773	195,970	276,977	260,490	336,598
Apr.	344,944	294,806	208,161	286,884	290,623	323,574
May	269,941	241,612	224,308	284,579	294,127	328,180
June	267,910	290,911	286,798	332,694	365,434	329,240
July	270,198	259,131	330,890	301,249	238,559	290,856
Aug.	261,976	196,985	225,768	331,932	220,420	298,012
Sept.	259,986	284,114	255,584	323,516	182,596	313,701
Oct.	219,803	244,060	259,016	313,623	195,313	307,080
Nov.	240,347	260,190	242,635	288,685	180,772	271,088
Dec.	222,478	366,125	196,510	246,196	235,688	266,600
Totals	3,210,489	3,222,858	2,773,444	3,436,216	2,904,409	3,664,247

	Orders Placed	Shipments
1957	3,073,179	4,179,708
1956	4,736,170	3,780,101

American Institute of Steel Construction.

Construction Costs

(1947-49 = 100)

	1960	1959	1958		1960	1959	1958
Jan.	143	139	137	July	143	142	139
Feb.	143	140	137	Aug.	143	142	139
Mar.	143	140	137	Sept.	144	143	139
Apr.	143	140	138	Oct.	144	142	139
May	143	141	138	Nov.	144	143	139
June	144	142	139	Dec.	144	144	139

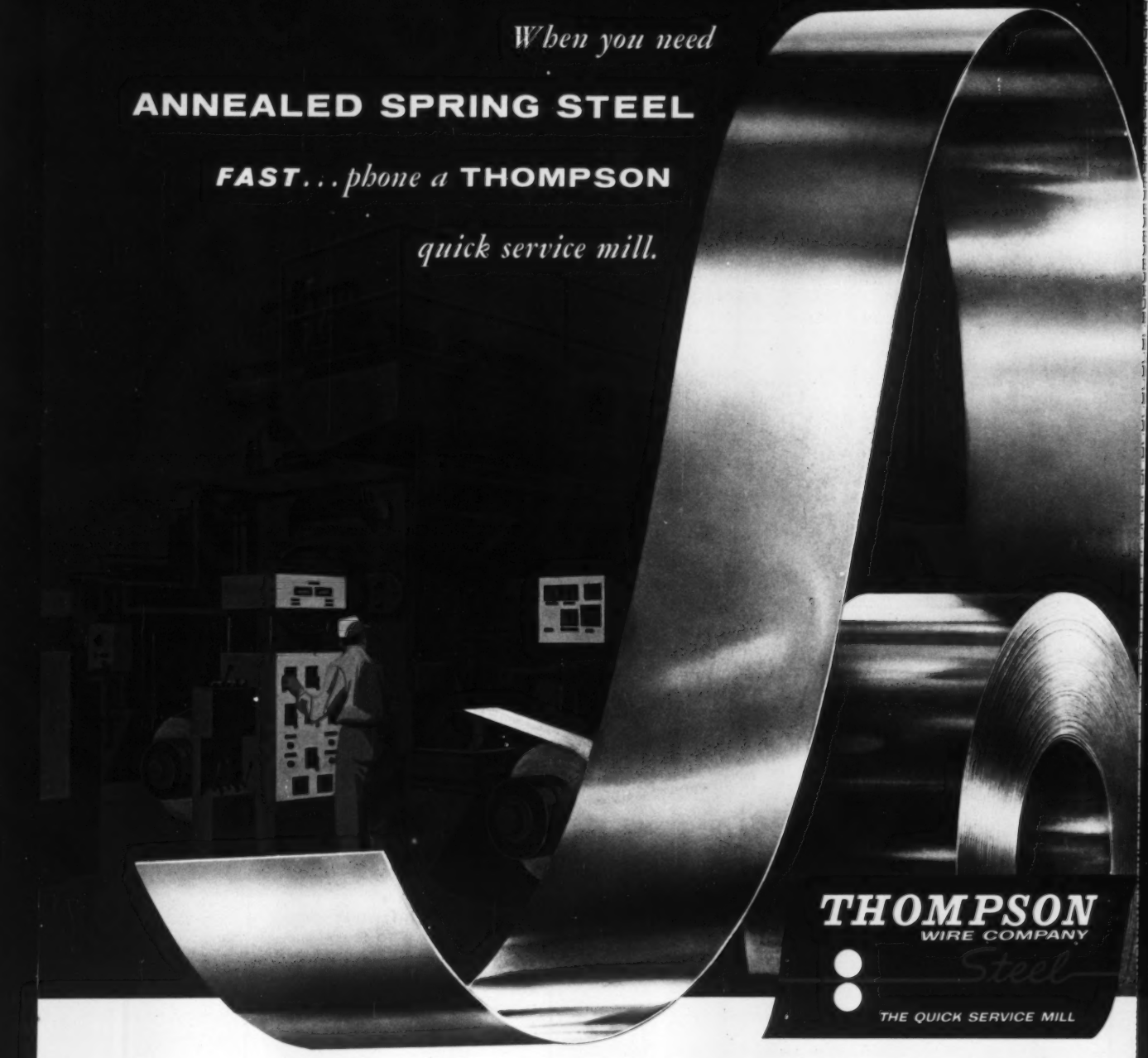
U. S. Department of Commerce.

When you need

ANNEALED SPRING STEEL

***FAST**... phone a* **THOMPSON**

quick service mill.



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We can supply you with grades and gauges of annealed spring steel most in demand—at mill price.

You are assured of prompt delivery as stocks are on hand at four convenient locations—Chicago, Detroit, Boston and Baltimore.

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THOMPSON WIRE COMPANY

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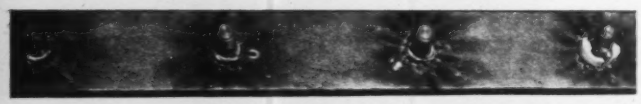
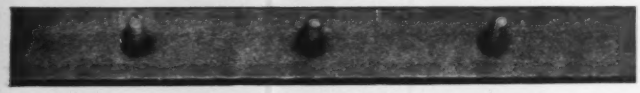
HOW THIS SPECIAL **OHIO WELD FASTENER** IS HELPING J. I. CASE REAP **$41,000 A YEAR IN SAVINGS**

plus the improved quality of their combines

A 485 per cent reduction in the cost of producing a product component seems fantastic, but that's how much J. I. Case, farm equipment manufacturers, slashed the cost of fastening the "rub bars" to their No. 1000 Model Combines. How? By switching to automatic projection welding and a specially designed Ohio Weld Screw. Here's how they did it . . .





THE PRODUCT

The Case 1000 Self-Propelled Combine is a heavy-duty machine designed for rugged, day-in and day-out service on large wheat ranches. It has to be able to withstand punishment, so sturdy construction is essential. Each of these combines has a cylinder with eight rub bars. On each bar are 12 weld screws . . . a total of 96 per combine.

THE PROBLEM

Prior to turning to Ohio Weld Screws, they used Arc-Welding stud and ferrule method to attach the fasteners. Welding costs, according to their own studies, were $10.27 per cylinder. Each of the eight rub bars on a cylinder took 4.85 minutes to weld. Welding quality was not uniform. Per part costs were $70.50 per thousand.

THE ANSWER

In the new system, two Ohio Weld Screws at a time are automatically resistance welded on a welder set up to handle two bars simultaneously. Weld costs now are $1.83 per cylinder . . . five times lower . . . and welding time has been cut to 1.12 minutes for every *two* bars! Part costs of the Ohio Weld Screws run $14.80 per thousand. Welding quality is far superior and uniform, and the Ohio parts are well up to the pull test requirements.

THE SAVINGS

METHOD	COSTS 1,000 PARTS	WELDING COSTS CYLINDER	TIME PER WELD	TOTAL SAVINGS
Old Method	$70.50	$10.27	4.85 min. per bar	.....
With Ohio Weld Screws	$14.80	$ 1.83	1.12 min. per *two* bars	**$41,025.00 yearly**

The savings made by J. I. Case are higher than most of the reports we have had, but their experience with electrically resistance welded Ohio parts is typical. Hundreds of manufacturers have and are finding they *can* bring costs down without sacrificing product quality through the efficiencies and economies enabled by the wide variety of stock Ohio weld screws, nuts and pins and special purpose Ohio parts. Not only do they speed manufacture, simplify later stages of assembly, and help to increase production; they also make possible improved product design and provide greater fastener strength.

Take a few minutes to write for our stock parts catalog. It's filled with photos and descriptions of many cost-cutting weld fastener applications. The ideas these applications may stimulate are certainly well worth the time it takes to dictate a short note.

OHIO WELD FASTENERS®

THE OHIO NUT & BOLT COMPANY

THE PRIMARY FASTENER IN FASTENER ASSEMBLIES

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STEEL

Technical Outlook

SUPERMAGNETISM— Magnetic fields of 100,000 gauss are predicted for an electromagnet arrangement using a columbium-tin compound as a cryogenic superconductor. The material becomes superconducting at about −427° F. Fortunately, only the magnetic coil need be at that temperature. The development could be used in magnetic forming, for containing plasma, and for communication equipment.

JOINING OILY METAL SURFACES— A two part epoxy adhesive (Loxite 3520) has been compounded by Firestone Tire & Rubber Co., Akron, to join oily metal parts. A short, high bake is recommended for optimum results (300 to 350° F for 2 to 5 minutes). Room temperature curing is also effective in providing high tensile and peel strength, says L. J. Campbell, vice president. Pressure is not necessary to effect tight seals. Field applications indicate utility in pipe bonding (at fittings) with strengths exceeding 3500 psi.

MASS PRODUCTION SATELLITE— Standardized configuration will contribute dollar savings by eliminating custom building in the Streetcar project. That's the name given to the program for building the orbiting geophysical observatory (OGO) satellite. NASA has awarded a contract to Space Technology Laboratories Inc., Los Angeles.

CERAMIC ADHESIVE— A maximum service temperature of 2600° F after being cured at only 250° F is claimed for a ready to use adhesive material called Melbond CA-100. It's designed for use with refractory materials such as ceramics, states Melpar Inc., Falls Chrurch, Va. Characteristics include high mechanical strength and good electrical properties.

RHENIUM-MOLYBDENUM ALLOYS— Commercial production of a ductile rhenium-molybdenum alloy is underway at Rhenium Div., Chase Brass & Copper Co., Waterbury, Conn. Costs are reported to be significantly below those of pure rhenium. Mechanical properties are better than those of pure rhenium or molybdenum. Elevated temperature strength exceeds that of molybdenum while good ductility is retained down to the cryogenic temperature range without evidence of embrittlement. Ductility permits cold or warm forming. Applications: Missile structural material and thermocouples, welding filler rod, and grids, heaters, and cathode supports for electronic tubes.

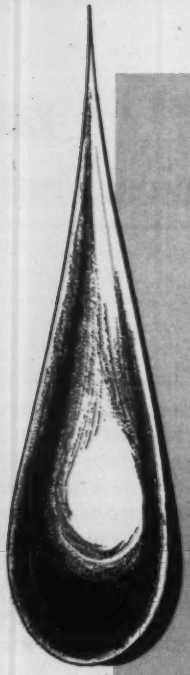
COMPUTER-BUILT COMPUTER— A computer built from information furnished by another computer (Bell Lab's Blade) was recently installed at a military post, says Bell Telephone Laboratories Inc., New York. The Blade system converts basic design data into manufacturing information. It controls automatic machinery that produces subassemblies.

VACUUM ARC STEEL MELTING—Advances in consumable electrode, vacuum arc, steel melting furnaces may include more electrodes, larger ingots, and crucibles in shapes other than cylindrical, says Midvale-Heppenstall Co., Philadelphia.

TIGHTLY BOUND GLASS— The Atomic Energy Commission reports the development of a glass containing 15 per cent plutonium so tightly bound in the structure that you can wipe its surface with your hand without picking up alpha activity. The development is expected to allow some handling of plutonium bearing fuel outside protected glove boxes.

THIN FILM DISTILLATION— GE's thin film water distillation process is feasible for municipal and industrial use, says R. G. Loecher of the company's Burlington, Vt., plant. Primary advantage: Low operating costs.

TUNGSTEN ALLOY AT WORK— Fansteel 99 electrodes are successful in plasma guns at temperatures of 30,000° F. Little contamination (from erosion) of the plasma occurs, says Dr. William M. Van Camp, McDonnell Aircraft Corp., St. Louis.



Nuclear Water Witching Upgrades Foundry Sand

Neutron source, detectors are placed in the probe

CLOSE CONTROL of moisture content in foundry sand is maintained with a nuclear gaging system at the Danville, Ill., plant of Central Foundry Div., General Motors Corp.

The system can measure the average moisture content of a 3200 lb batch of sand to an accuracy of ±0.05 per cent, at the 3 per cent level, in less than a minute. It was developed by Harvey A. Burley and Arthur D. Block, of General Motors Research Laboratories, Warren, Mich., and Milton J. Diamond, of Central Foundry Div., Saginaw, Mich.

● Faster, more frequent, more reliable moisture measurement makes for better casting quality.

The system isn't affected by temperature extremes and doesn't require an experienced operator. It indicates the moisture content of an entire weigh lorry of sand, instead of a small sample. And results are available almost instantaneously.

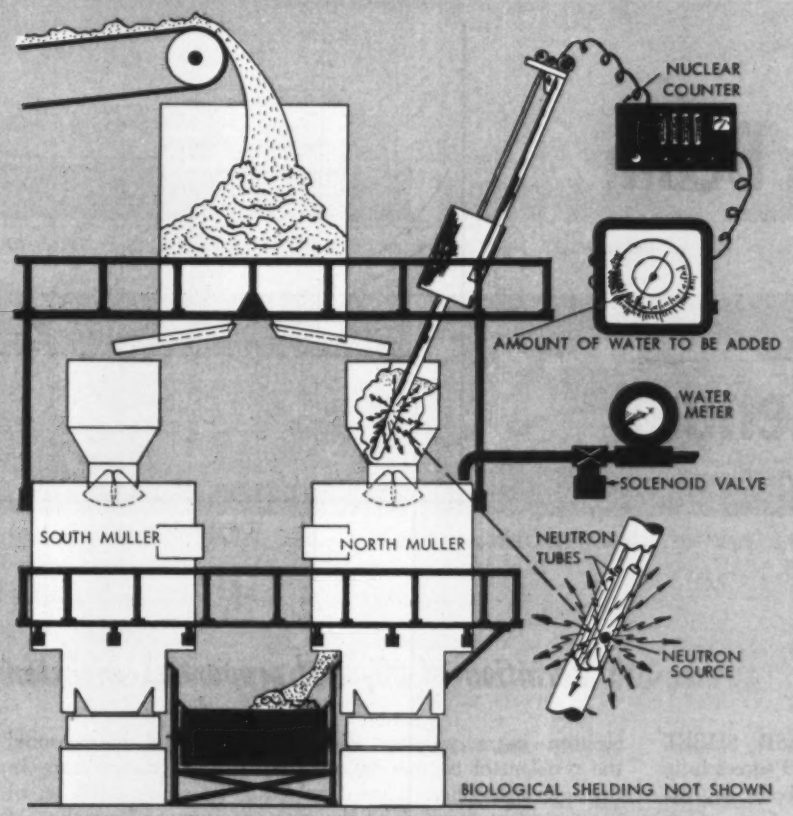
Complicated castings (such as crankshafts) require rigid control of sand moisture. If the sand is too dry, the molds break; if it is too wet, scabs and blowholes appear in the cast metal.

Previously, 100 gram samples were taken at 1 hour intervals and analyzed in the laboratory. The muller operator didn't know what corrections had to be made for at least 30 minutes. Meanwhile, about 100 tons of sand had been processed. To help maintain the correct moisture content, the operator continuously hand sampled the material, then adjusted the flow of water into the muller, judging requirements by the feel of the compressed sand. But that system wasn't reliable when less experienced operators were on the job.

● Operation of two mullers is scanned in sequence by one gaging system.

Sand from the storage bin is fed into two mullers, which are side by side and controlled by one operator. One moisture gage system is used for both machines.

When a 3200 lb batch of sand is run into the weigh lorry—which is above the muller, supported by a large scale—the electric feeder is turned off. At the same time, the moisture gage goes into opera-



MOISTURE GAGE PROBE contains radioactive material that emits fast neutrons; they are slowed by hydrogen nucleuses of water in the sand. Nuclear detectors and computer indicate moisture content, which is proportional to slow neutron count

tion automatically.

A stainless steel probe (which is buried in the batch of sand) contains detection equipment that transmits signals to a nuclear counter and computer. The computer is calibrated to indicate the amount of moisture in the sand.

When the operator presses a dump button, sand falls into the muller. The electric feeder refills the lorry, and the cycle is repeated. Circuit interlocks prevent dumping of the sand before the measuring cycle is completed. A few seconds after the sand is dumped, the computer energizes a valve that automatically meters the right amount of water into the muller. After mixing, the moisture corrected sand is discharged onto a vibrator conveyor and delivered to the casting line.

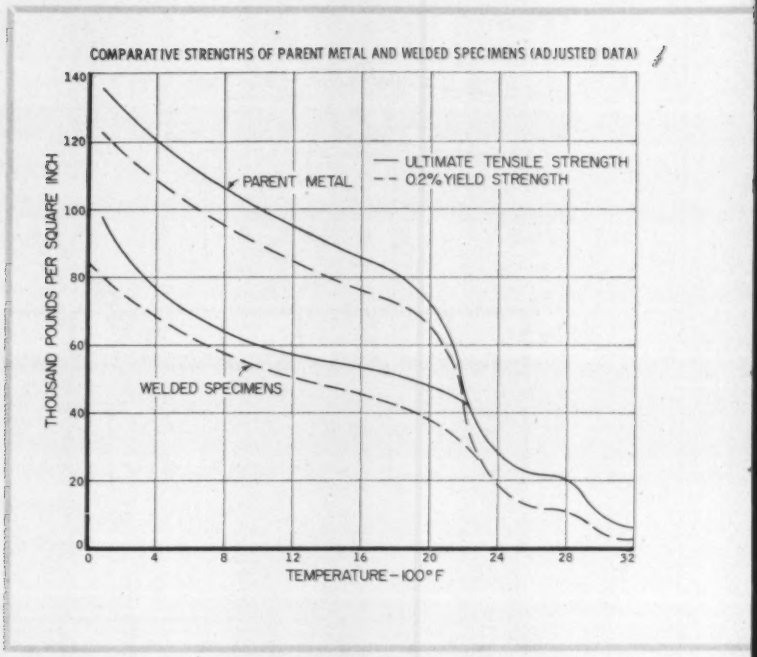
• Function of the metering system is based on the detector's sensitivity to hydrogen.

Neutrons—electrically neutral, nuclear particles that have a mass about equal to that of hydrogen atoms—can be classified in several categories, depending on their energies. Thermal, or slow neutrons, have an energy of about 0.025 electron volt and an average velocity of 1.4 miles per second; fast neutrons, an energy of 0.1 million electron volts or greater (a 1 million electron volt fast neutron has a velocity of about 8900 miles a second).

If hydrogen molecules are present in a field of fast neutrons, collisions are likely to occur; that causes the fast neutrons to lose some of their energy. About 18 such collisions are required to reduce a fast neutron with an energy of about 2 million electron volts to the thermal category. Heavier elements require many more collisions to thermalize their fast neutrons.

How that phenomenon is applied to moisture measurement: The engineers developed a 2 curie, plutonium-beryllium source of fast neutrons and a detector system sensitive only to thermal neutrons. When the source and detectors are placed in the sand, the number of slow neutrons detected in a given time is proportional to the number of hydrogen nucleuses present. And the only hydrogen present in significant amounts in foundry sand is in the form of water. Result: Output from the detectors can be related directly to moisture content.

Electron Beam Welds Molybdenum Sheets



. . . Variation of physical properties with temperature,

MOLYBDENUM-BASE SHEET materials can be welded successfully by electron beam methods, say experts from Marquardt Corp., Van Nuys, Calif. They base this judgment on short time tensile properties measured at temperatures between 80 and 3200° F, as well as metallographic, radiographic, and dye penetrant inspection.

Short time tests were employed because of the interest in molybdenum-base sheets for aerospace applications, where exposure temperatures are high but duration is short. Materials welded were two heats of arc cast, molybdenum-0.5 per cent titanium alloy, and a heat of vacuum sintered, commercially pure molybdenum. The samples were in the form of stress relieved sheets.

Marquardt reported its results at last week's Western Metal Congress, Los Angeles; the material was prepared (for a session sponsored by the American Society for Metals) by Ernest G. Thompson, Eugene C. Bernett, and Harold Binder.

• Electron beam welding has a number of advantages in the welding of molybdenum sheets, Marquardt states.

The high vacuum necessary for electron beam welding eliminates the problem of contamination from fluxes or atmosphere; some dissolved gases may be reduced by the process, although the heating time is so short that researchers find little loss of volatile alloying elements.

Marquardt lists these advantages:

- Preheat of material to prevent weld cracking is not mandatory.
- Relatively fine grained, narrow welds can be made.
- Contamination of the weld metal is minimized, as evidenced by its ductility.
- Weld porosity in sintered molybdenum is significantly reduced.

But further work will be needed:

- Weld bead profiles should be improved.
- Welding stresses should be reduced.

• Surface skin is removed before welding.

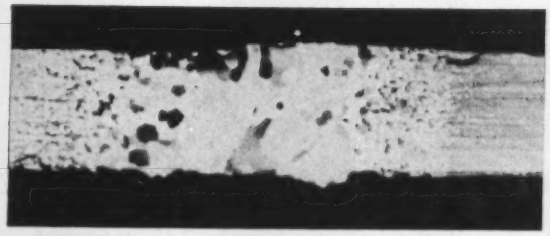
Earlier work at Marquardt on arc cast sheet molybdenum showed that the surface may have a higher recrystallization temperature than the interior. The phenomenon is associated with surface contamination; removal of the contaminated skin improves the characteristics of the material, as measured by the transition temperature in a bend test. So about 0.005 in. of material was removed from the surfaces by grinding.

To prevent the formation of laminations—a problem with molybdenum sheets because of low cross tensile strength and fibered microstructure—the panels were abrasive cut in preparing them for the tests. Other preparation steps included machining to get best fitup, and chemical cleaning prior to welding.

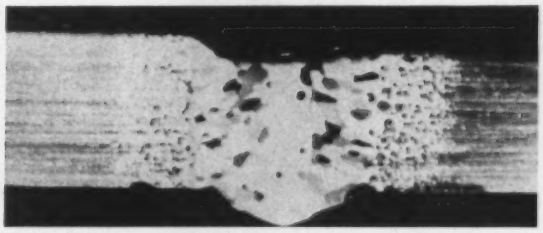
• Two types of welding equipment were used.

Low voltage (in this frame of reference) equipment operates up to 25,000 volts; maximum power output is 2.5 kw. The high voltage unit operates between 50,000 and 100,000 volts; maximum power is 1 kw because of lower current. In spite of the difference in power, which favors the low voltage equipment, the high voltage unit has higher heat density because of smaller spot size and higher operating potential.

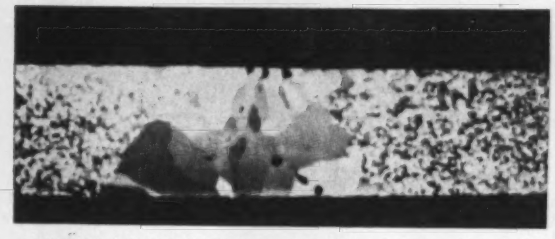
Result of those differences: Weld width to depth ratio with the low voltage equipment is 1:1; with the high voltage unit it is 2:1.



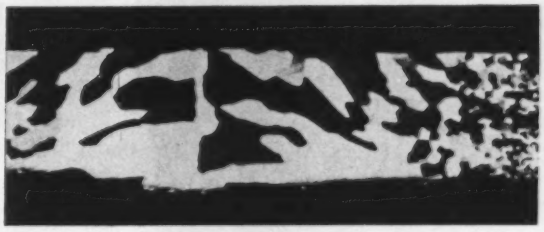
ELECTRON BEAM WELD at 25 kv. Affected zone in . . .



ELECTRON BEAM WELD at 100 kv is smaller



ELECTRON BEAM WELD in sintered powder, and . . .



TUNGSTEN INERT ARC WELD show differences

Transverse macrostructures, X20, polished and etched

. . . . appearance of weld sections show results at Marquardt

No filler additions were made to the welds, but two passes were made, one from each side to control penetration. The 25,000 volt equipment was used at a power input of 1.37 kw per pass; the speed was 10 ipm. With the high voltage unit, power input was 0.80 kw at 15 ipm. No preheat was required in either case.

• Welds were checked by dye penetrant and radiographic methods.

A difference was noted in the results of the porosity tests. Occasional porosity was found in the arc cast material, while welds made from sintered sheets had a higher level of porosity; it was assumed that the increased porosity arose from gas evolution from the material.

When compared with inert arc-welding, the electron beam welded joints were less porous. The inert arc-welded bead also showed a centerbead crack; it is believed to be due to oxygen from the sintered material.

Photomicrographs showed that the electron beam welded joints had:

• A relatively fine grained microstructure.

• Less oriented grains in the fusion zones (this is related to the welding speed).

• Narrow fusion and heat affected zones.

There were variations in the microstructure of the welds, associated with the method of welding and the original material which was joined. The commercially pure molybdenum has a lower recrystallization temperature than the arc melted; consequently the widest heat affected zone and the coarsest grain structure were found in the commercially pure material.

• Tensile specimens were prepared after rolling the welds.

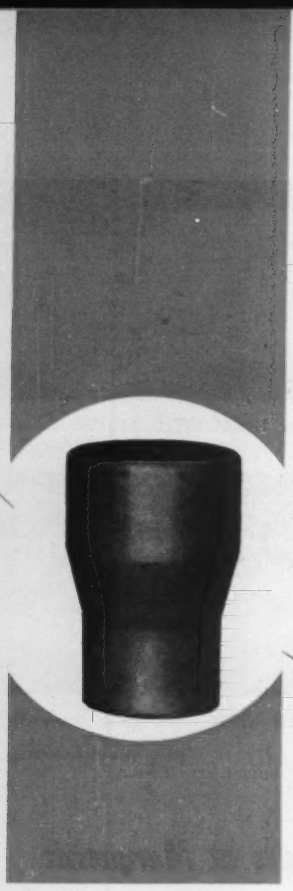
To eliminate surface variations, the welds were rolled under 3000 lb pressure, after heating to a dull red. Some panels cracked in roll planishing; they were all from the high voltage equipment, indicating that those conditions set up substantial weld stresses. Stress relief after welding is advisable.

For heated specimens, a thermocouple was attached to the sample to measure temperature. Specimens were heated by their own resistance in an atmosphere of hydrogen and argon, held at heat 5 minutes before testing. An optical pyrometer was used to survey the samples for temperature variations, and as the means of measuring temperature above 3000° F.

Because the tensile values were intended for missile type design calculations, the strain rates were about ten times faster than those used in conventional tests. Particularly at very high temperatures, that has the effect of giving higher tensile values.

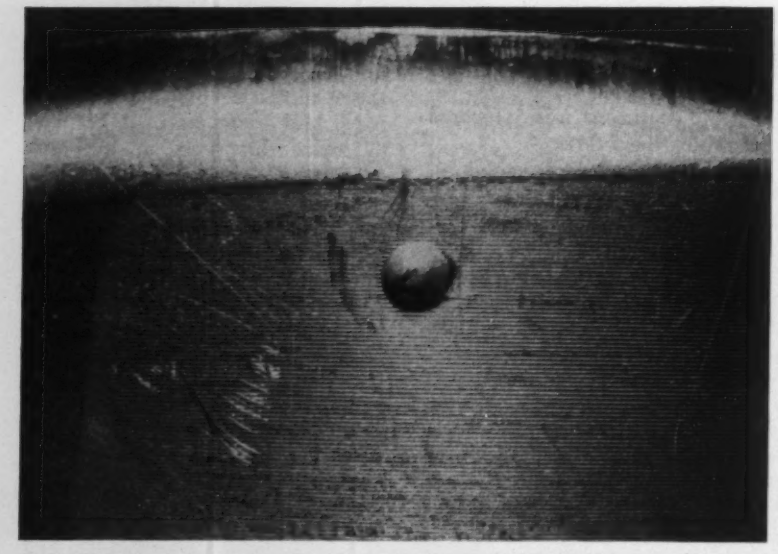
One of the effects which is apparent from the curve shown, and from other tests done at Marquardt, is the difference between the weld metal and the sheet material. The difference disappears in the area of 2400° F, as recrystallization of the coldworked sheet takes place. Judging by elongation results, electron beam welds appear to have a ductile-brittle transition in the neighborhood of room temperature, Marquardt reports. But weld ductility improves with increasing temperature, reaching a uniform level.

In what is, for molybdenum, the "lower" temperature range (up to 2400° F), welding causes a reduction in strength because the heat of welding eliminates the effects of coldwork. At higher temperatures, electron beam weld metal is equivalent to the basis material, Marquardt tests show.



Stainless steel tubes, 2-1/2 in. OD, are expanded to 3-1/4 in. in an aluminum die with maximum tube thinning of 0.0015 in. Electrical energy does the work, as . . .

Rohr Puts Electroforming on Line



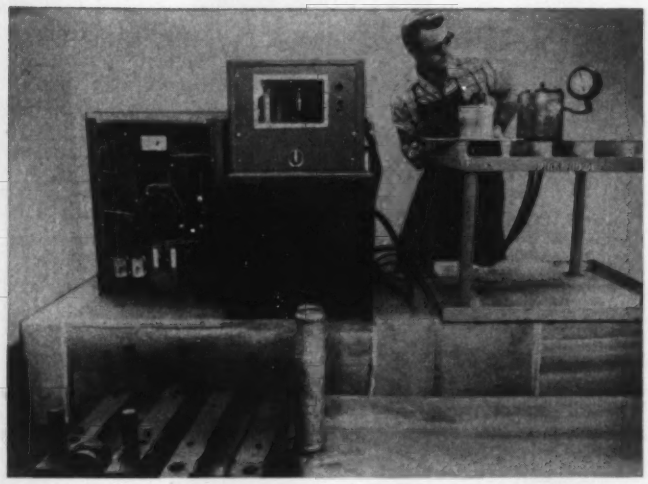
Magnification show marks from the aluminum die impregnated in the steel part. The 1/8 in. vacuum evacuation port in the die appears as a nearly pierced hole

ABOUT A DOZEN new aircraft and missile parts are tooled for electric discharge forming at Rohr Aircraft Corp., Chula Vista, Calif.

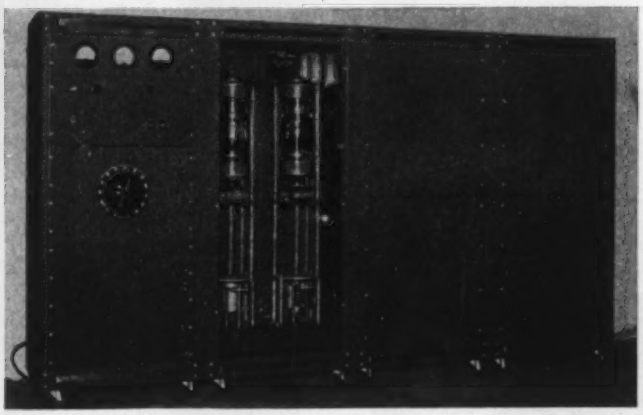
The process delivers an impact of electrical energy that moves as a shock wave through water to force the part into a die. G. C. Cadwell, manufacturing research engineer, says the process has emerged as a full fledged production technique at Rohr.

• The process has a potential far beyond its present applications.

Mr. Cadwell says the process should be able to form materials up to 1 in. thick and as big as 10 ft in diameter. Even more important, he feels, is the production rate: It's higher than that of other high energy forming techniques.



This is the four-year-old experimental setup (revised several times) for spark forming parts at Rohr



The new production unit is modular, can be extended to fabricate large and heavy aircraft and missile components

"It has been established with production parts that the cycle time between firing and reloading parts into the dies averages about 4 minutes. This is based on hand loading. Considerable savings can be effected on high production setups where some degree of automatic loading can be justified. Since the energy release can be triggered on an average of once every 30 seconds, a large area exists in which the part loading and unloading operation can be narrowed down profitably."

Tooling costs appear as another important factor favoring the electric discharge process. Rohr favors cast aluminum dies calling for minimum machining.

Plastic dies have also been used experimentally and found suitable for some jobs.

• The degree of control of the energy can be extremely fine.

As an example, Mr. Cadwell says that plastic dies were used successfully when forming parts; yet, at the same energy level, the dies "shattered like glass" when the blank was not there to absorb the shock energy.

That degree of control makes it possible to establish the precise energy level needed, without causing excessive stress loads on the dies. It is possible, for example, to form hundreds of hard steel parts in an aluminum die without a sign of die erosion. The forming of a steel part in an aluminum die is so precise that minute tool marks on the die are coined into the steel.

The process has the advantages of other high energy rate forming techniques (such as explosive forming), but the equipment is entirely compatible with indoor shop operation. The only safety problems, apparently, are those associated with any high voltage equipment.

• Rohr has developed equipment that can be expanded for extremely high outputs.

Original experiments and a lot of production work have been handled with a 6 kv machine with 4300 watt-seconds output. A second facility of 14.4 kv capacity and 11,500 watt-seconds output is also being used, but it hasn't been necessary for Rohr to use its full capacity.

The new equipment is designed on the module principle, so that units can be added to provide as much as 46,000 watt-seconds of output.

Mr. Cadwell says Rohr's aim has been to develop an efficient facility in which electrical losses are kept low, assuring delivery of the output to the work. Because of this approach, the company has been able to handle the bulk of its production jobs with relatively low power input equipment.

• Transducer development is needed to permit higher outputs.

The basic requirement for all transducers used at Rohr is an ability to withstand the repeated firings necessary to economical operation. The requirement is being met at lower shock levels.

Transducers have survived more than 100 firings before it was necessary to redress their surfaces. Mr. Cadwell says: "This type service along with precise reproducibility of output energy levels makes electric discharge forming a leading contender in the field of high energy forming processes."

Rohr engineers on the project say research is also underway to use the electric sparks for both mechanical and metallurgical joining of metals. In addition, the power packs are being used for forming by the exploding wire method. Wires measuring up to 0.080 in. in diameter and up to 14 in. long have been vaporized in a series of tests.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

Permanent Molds Lower Titanium Part Expense

Up to 100 casts per mold (mild steel) are probable

"PERMANENT" molds are the secret of a cost cutting titanium casting procedure announced by Titanium Metals Corp. of America, New York.

Applications include pump housings, impellers, valve bodies, fittings, pump sleeves, and other intricate parts where high strength, accuracy, and stability are important.

• In work completed to date, the company has produced 40 castings per mold (mild steel) and points out that at least 100 are probable.

The first commercial order accepted by the company—for nine, 12 lb impellers—showed that mold costs were substantially reduced.

Present equipment limits production to 12 lb parts with maximum boundaries of 24 x 10 x 5 in. Yield strengths range from 25,000 to 100,000 psi depending on the grade of unalloyed titanium used. In general, properties obtained have been similar to those achieved in bar products.

Porosity appears to pose a few problems in sections ½ in. and greater, but with proper die design, porosity can be moved to areas where it is not harmful. TMCA checks stressed or rotating parts with x-ray. No surface porosity has been encountered.

• The process relies on the excellent fluidity of titanium.

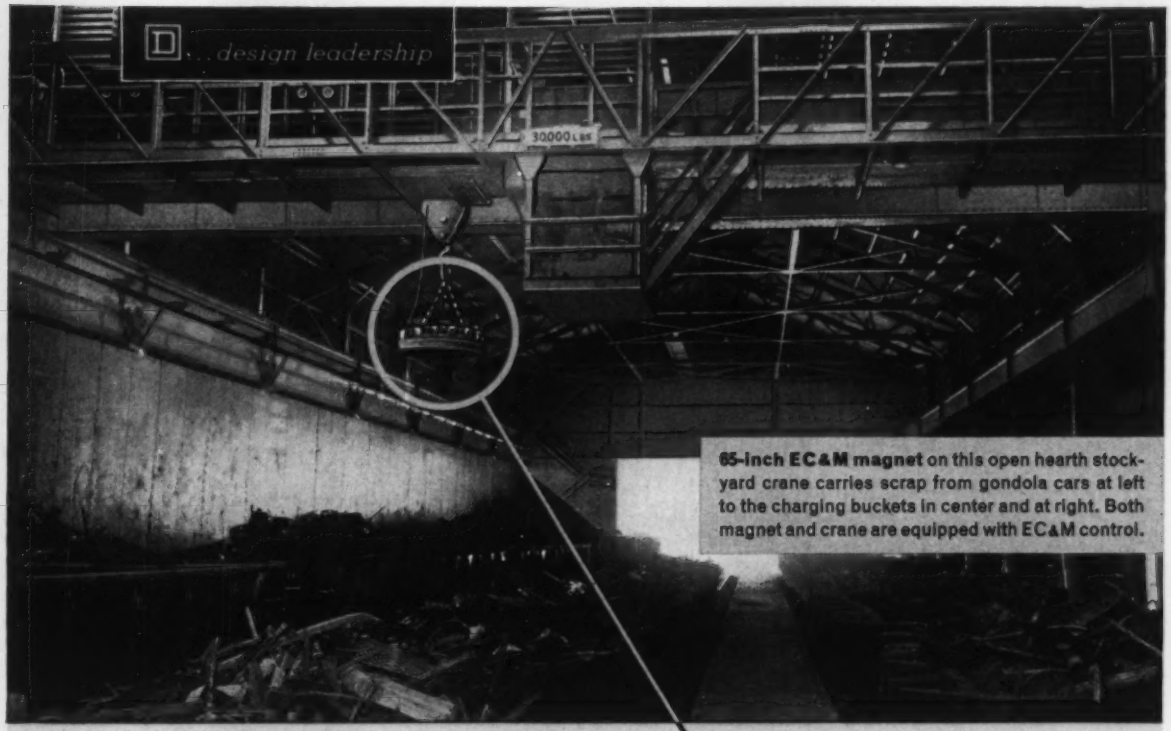
It requires a titanium electrode, double melted, with molten titanium impelled into the die cavity. The shrinkage rate of titanium (0.005 in./in.) makes timing a critical factor in feeding the metal into the die cavity and pulling the cores before the metal freezes to them. TMCA now controls the timing automatically (originally it was done by stop watch). Cores measuring 12 in. (about the size pulled from a cast automobile engine block) have been pulled successfully.

Ultrasonic Gage Checks Sheet Thickness Quickly

Ultrasonic resonance gaging is used by Eastern Steel & Metal Co., New Haven, Conn., to lower the cost of measuring sheet metal thickness. Sorting is faster, and the company finds it gets more informative results.

The company processes low carbon sheet steel, from 28 to 10 gage. The ultrasonic unit (Model 14 Vidigage) can check thickness at the center of the sheet as easily as at the edge. In addition, the company reports that the gage can be checked without lifting the sheet off the stack.

Thicknesses of about 0.005 to 2.7 in. may be determined to accuracies of 0.1 per cent—even closer when an automatic recording accessory is used. The Vidigage is made by Branson Instruments Inc., Stamford, Conn.



65-inch EC&M magnet on this open hearth stockyard crane carries scrap from gondola cars at left to the charging buckets in center and at right. Both magnet and crane are equipped with EC&M control.

EC&M ALL-WELDED Magnets Give EXTRA Lifting Power

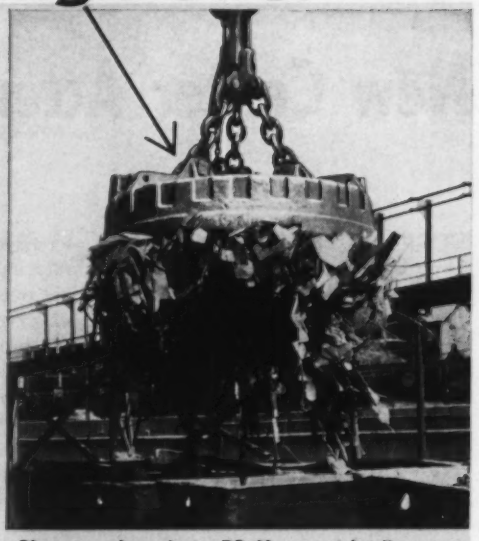
and Extra Lifting Power means Lower Handling Costs

• You get extra lift with EC&M all-welded construction. Because the pole shoes are welded in place, they fit more snugly—and they stay that way. Recesses for bolts are eliminated. The result—a more efficient magnetic path, with the entire face of the magnet effective for lifting.

EC&M welded magnets give you other advantages, too. The continuous weld makes them completely waterproof. They have greater impact-resistance, are better able to take the hard knocks of mill operation. If outer leads should be damaged, solderless connectors under protective covers simplify replacement.

EC&M lifting magnets are available in diameters from 39 to 80 inches. Magnets with bolted construction are also available when desired, as well as light-weight magnets for fast-moving mobile cranes. For any magnet, it makes sense to specify an EC&M controller.

Write for details! Bulletin 1300 gives information on the complete line of EC&M magnets and controllers



Close-up view shows EC&M magnet loading scrap into the charging buckets. The special low-carbon steel housing has high permeability, contributes to extra magnet efficiency.

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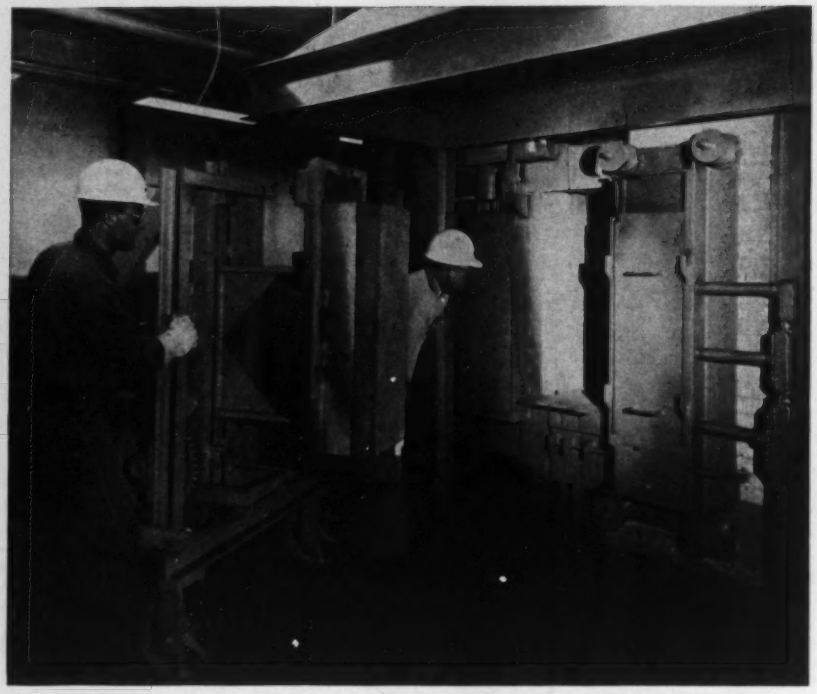


High powered microscopes, small scale coke ovens aid in research . . .

New Center Accents Raw Material Study

MORE ECONOMICAL manufacture of quality steels and more efficient exploitation of Western iron ores and other raw materials are the prime purposes of projects at a new raw materials research center at the Geneva Works, Provo, Utah, of Columbia-Geneva Div., United States Steel Corp.

• **Immediate Objectives** — Studies are being made on the concentration and agglomeration of iron ores to produce better burden materials for the division's blast furnaces; on the blending of coal and its conversion into high quality coke; and on the evaluation of Western deposits of raw materials—such as limestone, manganese ore, and fluorspar.

Several kinds of coal are crushed, screened, and blended, then charged into one of the four miniature coking ovens. Studies are made of the physical and chemical qualities of the product.

Small scale testing of iron ore samples is done in a batch testing laboratory. The ore is ground, concentrated in magnetic separators, filtered, and dried in ovens. Other methods of iron ore concentration also are under study.

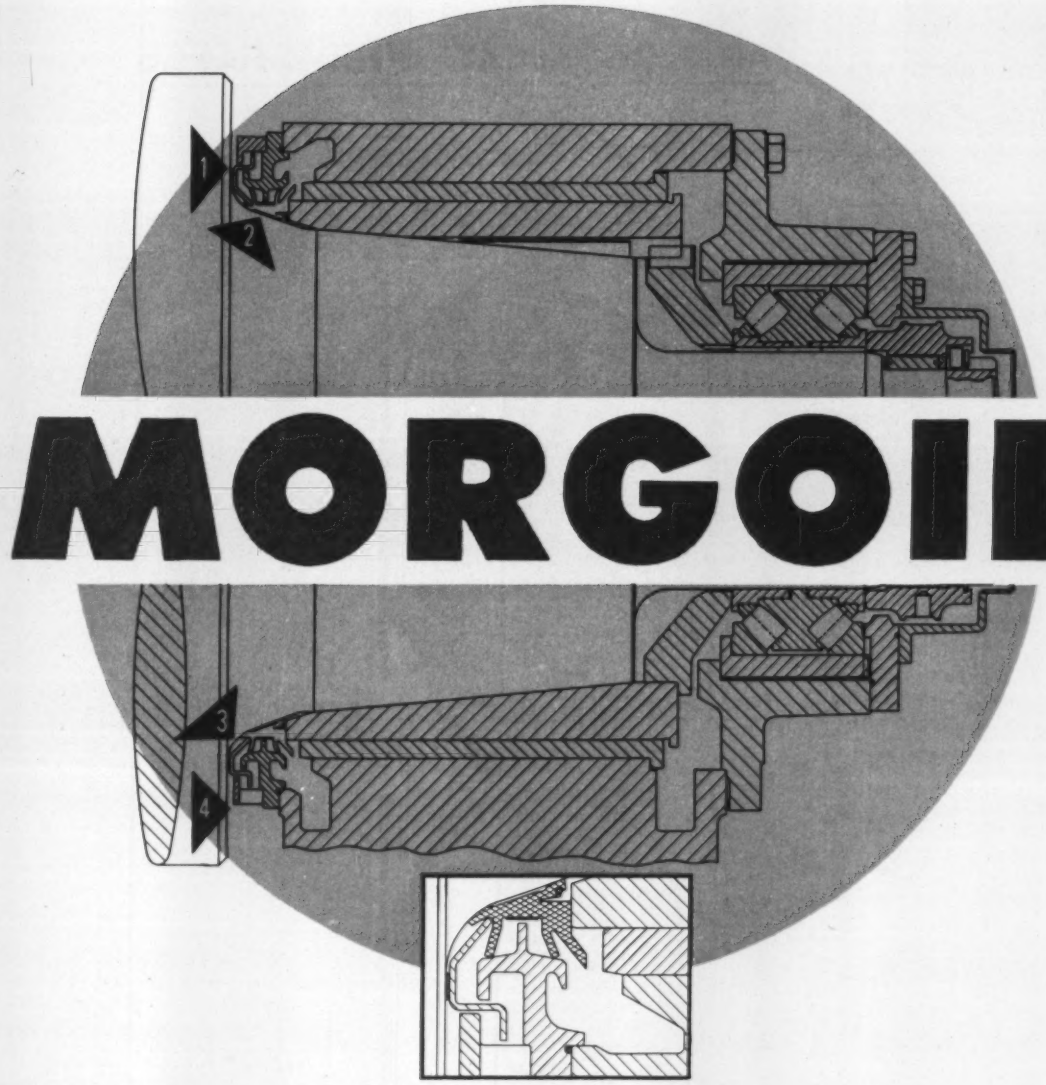
Facilities include an instrument laboratory, an analytical laboratory, and a microscopy laboratory —where high powered microscopes are employed to study sample characteristics at temperatures up to 1800° F.

Photographic attachments make it possible to record the studies on color film.

• **Flexible System** — Conveyors, cranes, and portable processing equipment in the main building are mounted on adjustable, multilevel floors. That makes it possible for researchers to combine processing units and give continuity to the flow of materials through the building.

Iron ore and coal samples are brought to a receiving and storage area at the rear of the building for stockpiling or immediate use. Drill cores, field samples, supplies, and equipment not in use are kept in a sample storage building.

Raw materials that must be crushed before testing are processed in outdoor preparation facilities. Material as large as 12 in. in diameter can be reduced to particles no larger than ¼ in.



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The New Concept in Bearing Seals - Check these Advantages

1. Coolant kept out of bearings by non-rubbing, large capacity gutters. Oil contamination and roll end face wear eliminated.

2. Oil kept in by the MORGOIL flinger, now in molded synthetic rubber. A static spring loaded lip seal replaces sleeve packing.

3. A deep interlocking labyrinth with twin seals rubbing on a chrome plated surface seals in both directions for added protection.

4. The MORGOIL roll coolant drain has a large area to prevent clogging by mill scale. Outer seal ring also protects rotating parts.

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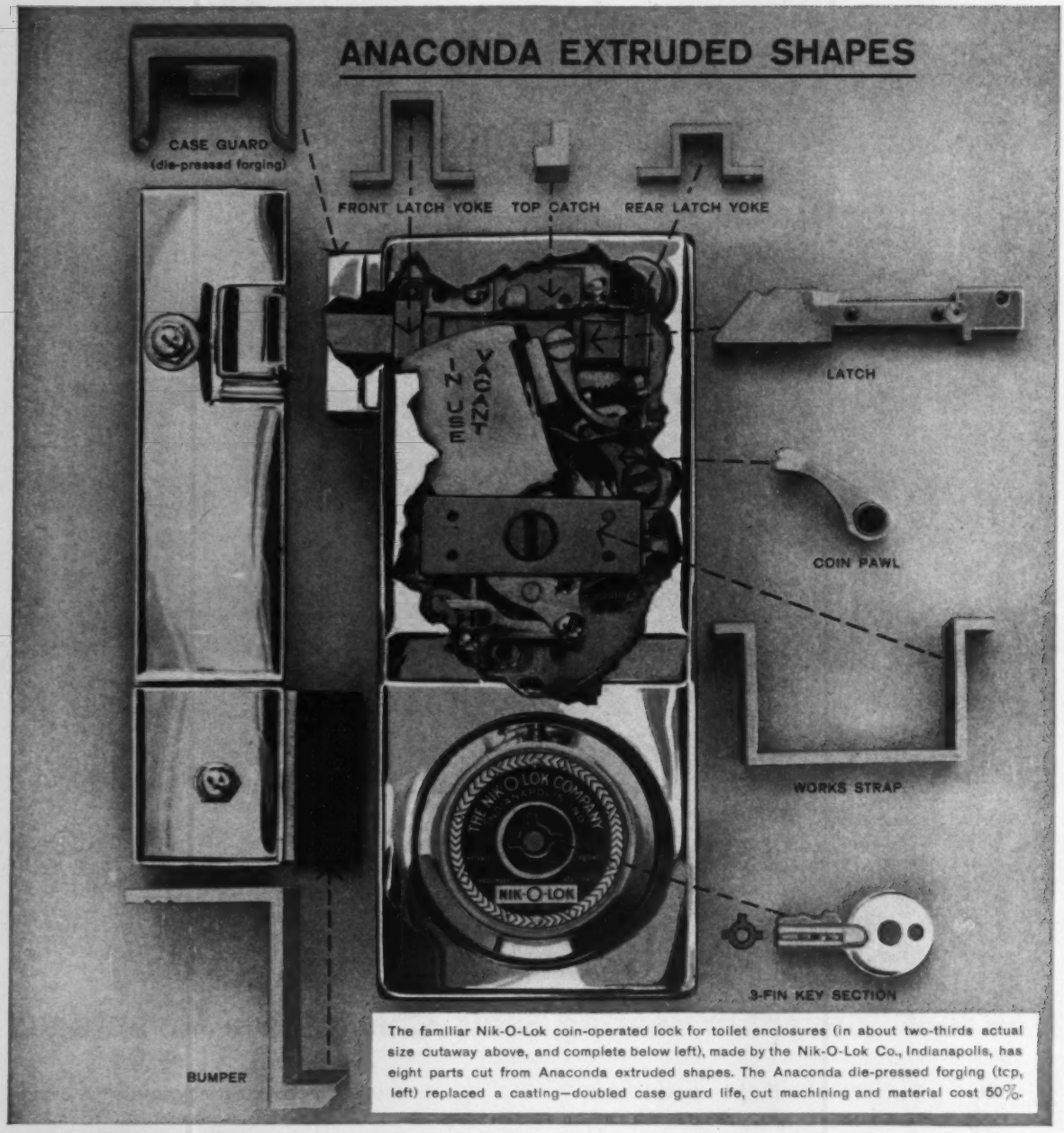

The familiar Nik-O-Lok coin-operated lock for toilet enclosures (in about two-thirds actual size cutaway above, and complete below left), made by the Nik-O-Lok Co., Indianapolis, has eight parts cut from Anaconda extruded shapes. The Anaconda die-pressed forging (top, left) replaced a casting—doubled case guard life, cut machining and material cost 50%.

How parts sliced from long lengths of "premachined" brass shapes cut costs. It starts in design. You select cross sections which minimize subsequent machining—and scrap. The only limitation is that grooves, slots, etc., must parallel the axis of the extruded bar. The smooth surface of extruded shapes reduces many finishing operations. And high dimensional accuracy simplifies assembly. In addition, you get superior, long-wearing parts that improve the quality of your product, because of the strong, homogeneous wrought-metal structure of extruded shapes. For imaginative and practical help in adapting extruded shapes to the economical production of intricate parts, see your Anaconda representative. Or write: Anaconda American Brass Company, Waterbury 20, Connecticut. In Canada: Anaconda American Brass Ltd., New Toronto, Ontario.

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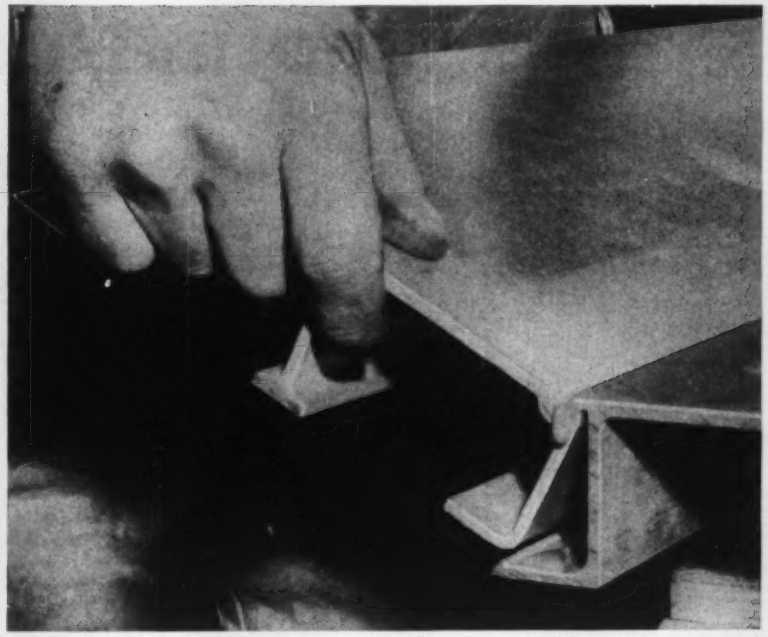
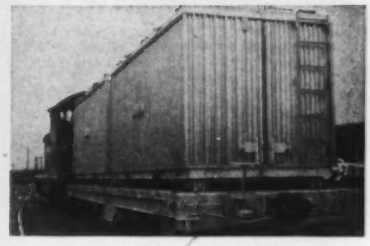
Extrusions Reduce Panel Costs

Interlocking units simplify job of assembling shipping containers





FIRMS that employ interlocking aluminum extrusions for assembly of shipping containers or for other panel construction can trim their costs sharply (as much as 60 per cent for labor and 25 per cent for material), says Reynolds Metals Co., Richmond, Va.

The extrusions, called Snap-Lock, are simple to assemble, says A. T. Adams, project director of the Transportation & Machinery Section. One extrusion is held firmly and the other is rotated into position. During rotation, a protrusion forces an adjoining leg to deflect and then snap into place to permanently fasten the joint.

• The extrusions are being tried in several applications.

Examples: Ship deckhouses, housings for electrical switchgear, aircraft hangar doors, refrigerator car doors, boxcar doors, and cargo containers.

An 8 x 8 x 17 ft cargo container is being given impact tests by the Chicago, Rock Island & Pacific Railroad at St. Louis. Extrusions were first used in the walls. In the latest design, they're also used in the roof. Repeated impacts at speeds up to 8 mph have failed to damage the units.

• With the aid of an automatic assembly machine, two men can assemble an 8 x 17 ft panel in about 8 minutes or less.

Using a modified squeeze rivet gun and an assembly table, the job takes less than 15 minutes. Units can also be put together by hand.

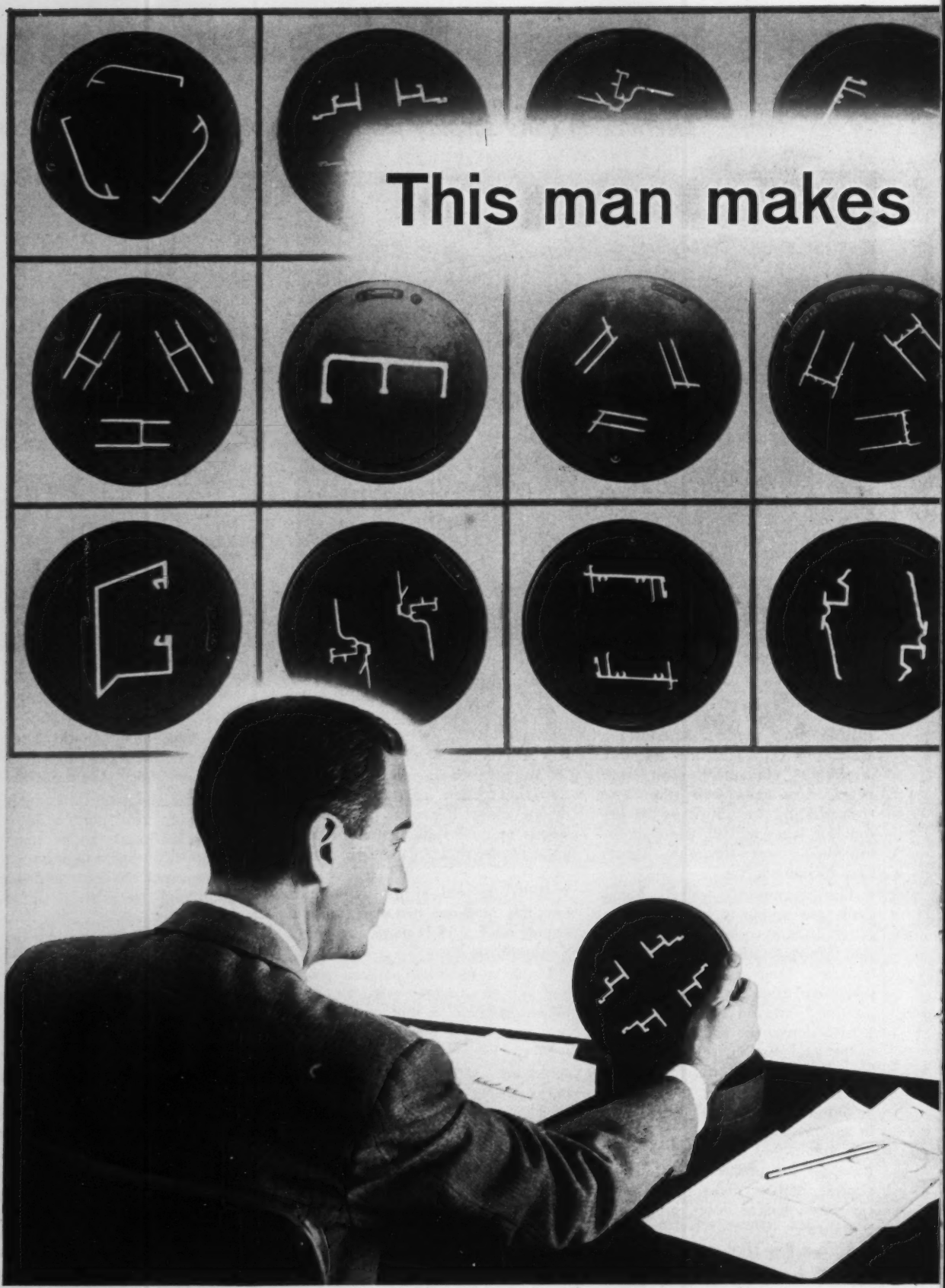
Scrap loss can be reduced by specifying extrusion length. In many cases, a lower priced alloy such as 6063-T6 can be used. Strength and corrosion resistance of 6063-T6 is satisfactory for various applications. The extrusions can be designed to almost any required strength. Adhesives or sealants, when necessary, can be applied with conventional caulking equipment.

• An improved automatic assembly machine is expected on the market soon. Cost: About $6000.

Automatic equipment for mixing and spraying two part adhesives into extrusion joints can be bought for about $5000 (adhesives or sealants waterproof the joint and supply additional strength).

• Changing the rib spacing does not increase assembly costs.

Closely spaced ribs produce a rigid, rugged container and reduce damage. When damage does occur, it will usually be confined to the 2 to 7 in. space between the supporting ribs. It can be repaired by cutting out the damaged area with an electric handsaw and attaching a small sheet patch with rivets or adhesives, or by welding. Major damage can be repaired after the damaged area is cut away by using Snap-Lock extrusions. The Snap-Lock joint is a permanent connection and cannot be opened for repair or replacement.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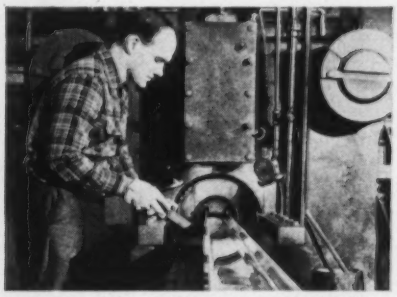

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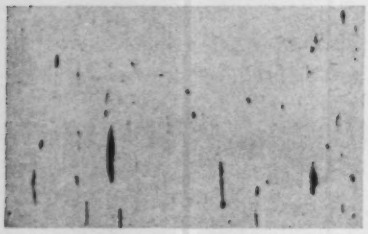
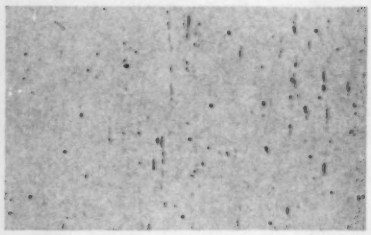


STANDARD analysis shows more inclusions due to higher sulfur



NEW steel has fewer inclusions, but machines better

A NEW free machining steel, similar to AISI Type 303 but with a lower sulfur content, offers better machinability, improved corrosion resistance, and excellent surface finish.

The producer, Universal-Cyclops Steel Corp., Bridgeville, Pa., designates the patented material as Uniloy 303MA.

It's an entry in a rapidly growing field. Stainless tonnage, says W. J. Long, sales vice president of Universal - Cyclops, more than doubled from 1947 to 1957, and will nearly double again in the 1957 to 1967 period. Biggest sales for the new alloy are seen in cold finished bars, which have had similar growth—from 22,700 net tons in 1947 to 58,300 net tons in 1957; the estimate for 1967 is 118,000 net tons.

• Improved results have been reported in many areas of forming.

Addition of aluminum to the alloy has made it possible to reduce the sulfur content yet improve machinability and formability. Field tests have confirmed laboratory predictions, says Mr. Long.

• In a screw machine operation, time taken for forming and threading was cut by 23 per cent; tools lasted 15 per cent longer; and broach life was boosted by 40 per cent.

• When sheets were tried in making screen plates, milling cutters and slotting saws gave double the service life that had been experienced with regular Type 303.

• Locknuts were machined 29 per cent faster in a multiple spindle automatic, and surface finish was improved.

• Machining time on a hinge pin used for meat processing equipment was cut from 17 to 11½ seconds per part—and the shop reports that it can hold closer tolerances than had been possible before.

• In producing mechanical seal cap retainers, rolling had resulted in a 20 per cent reduction rate due to splitting. The new material solved the problem, with the added benefits of reduced inspection time and improved surface finish.

• Key to the new steel is the addition of aluminum and the reduction of the sulfur content to half the level of Type 303 stainless steel.

In producing Type 303 stainless, says Universal-Cyclops, the sulfur additions showed up as inclusions. While machining qualities were improved, the inclusions made for poor surfaces and led to cracking when the metal was deformed.

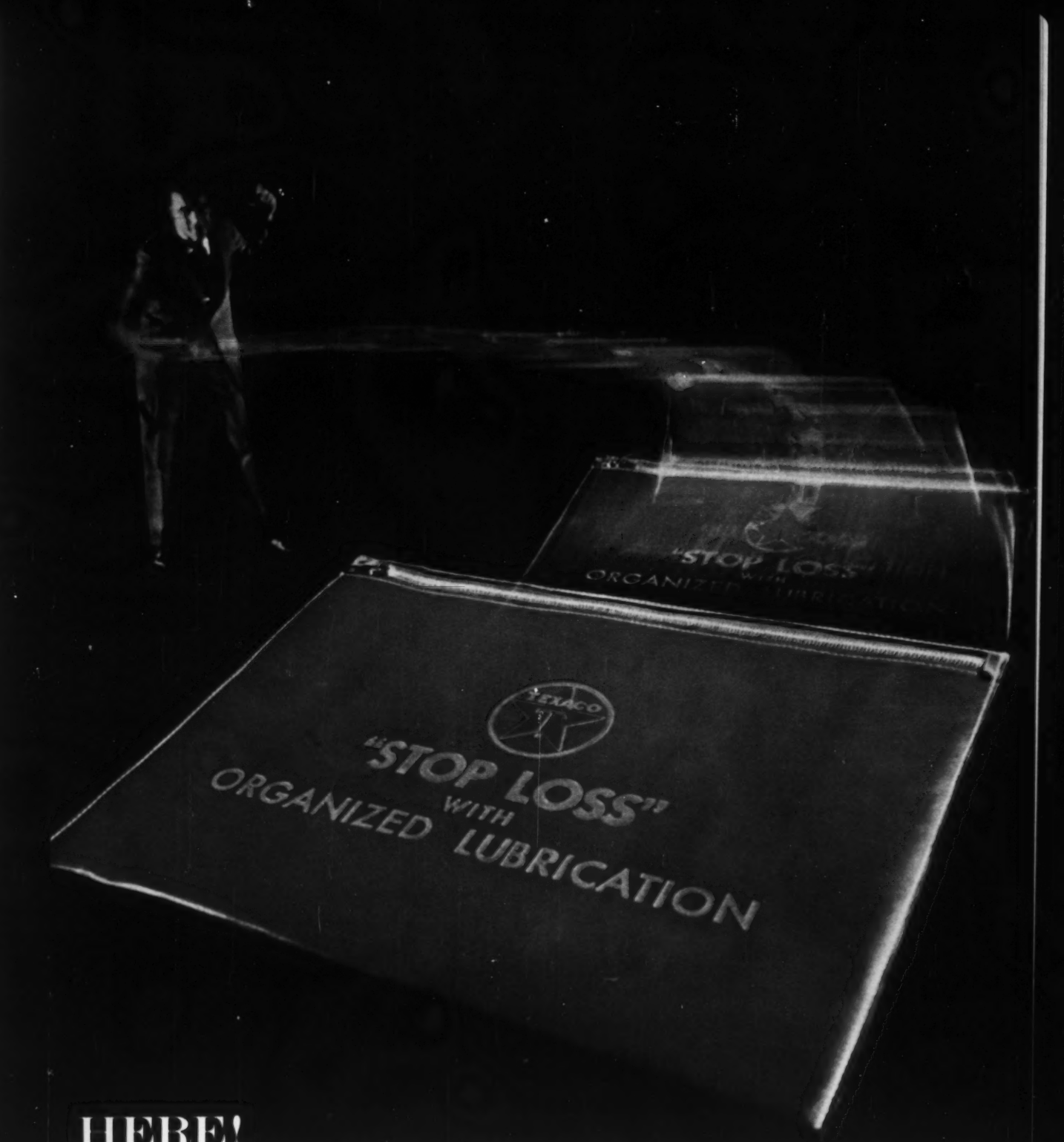
With the new steel, threads can be rolled. Compared with thread cutting, there is a considerable cost saving.

Since the alloy has fewer inclusions, electropolishing develops a high surface luster.

When the alloy was checked for corrosion resistance, it gave an average loss on the Huey test (five successive immersions in boiling 65 per cent nitric acid for 48 hours each) equivalent to 0.0024 in. per month. That compares with 0.002 in. on Type 304, and 0.0608 in. on Type 303.

The alloy is similar to AISI Type 303 in most elements. In both, carbon is 0.10, manganese 1.50, silicon 0.50, chromium 18.00, and molybdenum 0.50 per cent. In the new alloy, nickel is raised from 9.00 to 9.25, sulfur decreased from 0.25 to 0.13 per cent, and 0.70 per cent of aluminum is added.

The alloy is available in bar form from local stocks. Forging billets, forgings, plates, sheets, strip, and wire can be obtained from the mill.



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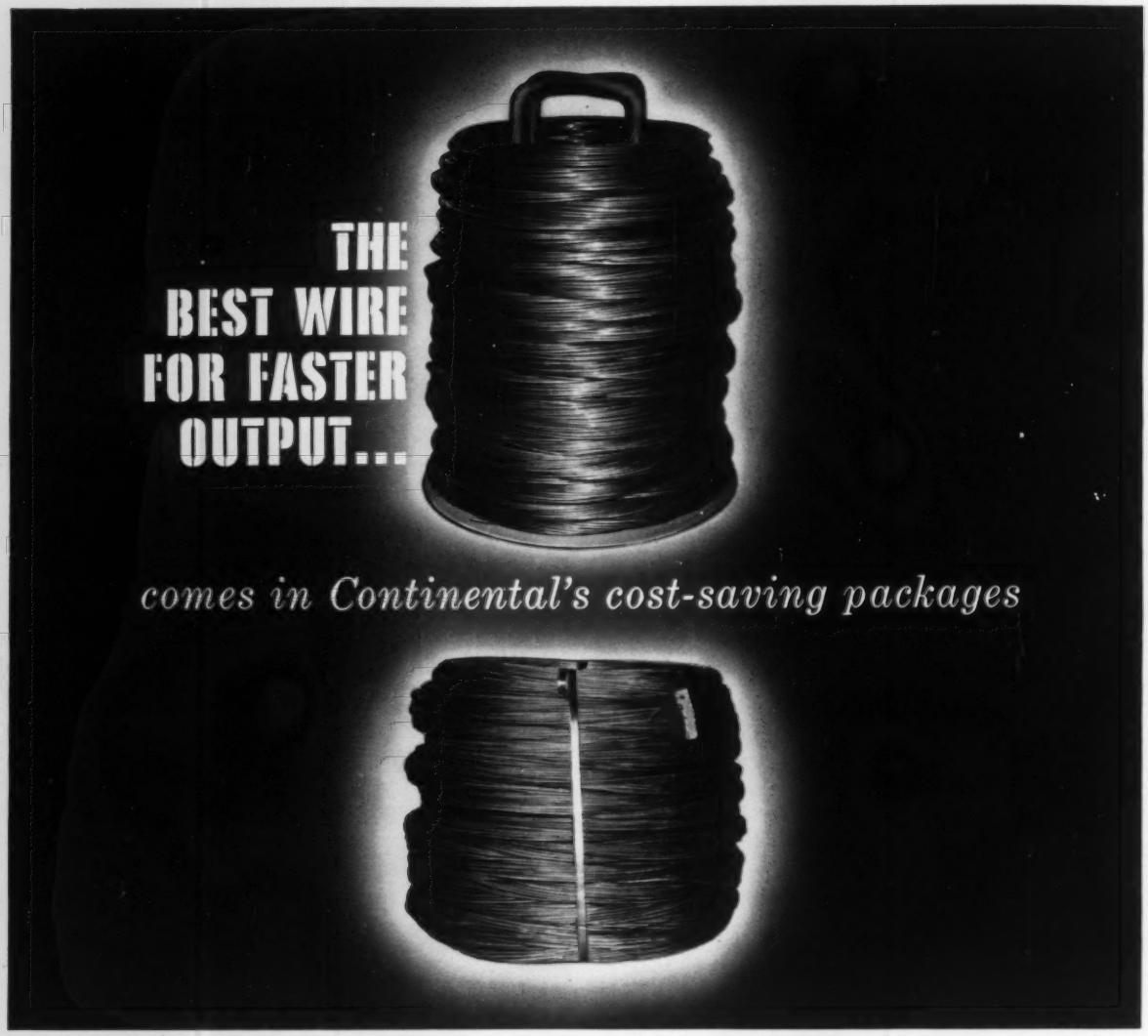

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Forge Shop Saves by Spraying Lubricant

Spray application of die lubricants in the forging department at Mueller Brass Co., Port Huron, Mich., saves the company between $15,000 and $17,000 a year compared with the cost of swabbing by hand.

Time studies have confirmed validity of the company's decision, made some time ago, to use the spray process on all crank forging presses in the department. From 250 to 2,000 tons in size, they handle a wide range of brass and bronze forgings.

In the Mueller forge shop, dies are preheated (300 to 600° F). The temperature depends on the alloy being forged. Slugs of the copper-base alloys are preheated in special conveyor type furnaces adjacent to each press; again choice of alloy determines the preheat temperature which ranges from 1100 to 1600° F.

Mueller designed a special spray unit which lubricates upper and lower dies simultaneously, with Prodag, a water based graphite dispersion produced by Acheson Colloids Co., Port Huron, Mich., a division of Acheson Industries Inc. The dispersion is diluted 1:35 with water before use; the thin liquid is easy to spray, has little tendency to build up on dies.

Hand swabbing with more viscous materials had been inefficient. In hard to reach areas, lubrication often was insufficient so that parts would stick in the cavity. Then the part would have to be pried from the die, so that production time was lost and the work had to be scrapped. But uneven hand lubrication also meant excessive lubricant in other die areas. In deep cavity dies, excessive pressure sometimes cracked dies, or improper fill caused faulty forgings. If cracked dies were left in the presses, grinding of the forgings was required to clean up the surface, adding to cost.

O. M. Hanton, chief forging engineer for Mueller, regards the cost saving in application time as a bonus, the original reason for going to the graphite dispersion being to improve die life and cut scrap.

BEFORE BRUSHING
Insulation residue on this small, copper electric motor commutator was a knotty, costly cleaning problem. Rate: 800 per hour.

AFTER BRUSHING
Surface quality-finished . . . insulating material and feather burrs gone . . . ready for trouble-free assembly. Rate: 3500 per hour.

Production soars from 800 to 3500 pieces per hour

...with OSBORN power brushing

PRODUCING at the rate of 3500 pieces per hour (over 330% greater than former off-hand method) these Osborn TY® Master® Wheels remove troublesome phenolic-type residue from electric motor commutators at Dayton Precision Manufacturing Co.

Slow, off-hand methods were being used to remove insulation residue from these commutators. Production was costly . . . parts lacked uniformity.

A specialized, but simple machine now handles the operation. Parts are automatically fed along a guide tube and through a pair of Osborn TY® Master® Wheel brushes. In this centerless type finishing setup—the job is done effectively in pre-set time cycles. Results: production and quality up—rejects eliminated . . . time and costs down.

Cleaning and finishing problems in your plant can be solved with similar production savings. An **O**sborn **B**rushing **A**nalysis—made in your plant now at no cost or obligation—is the first step. Write us for full details. *The Osborn Manufacturing Company, Dept. S-33, Cleveland 14, Ohio.*

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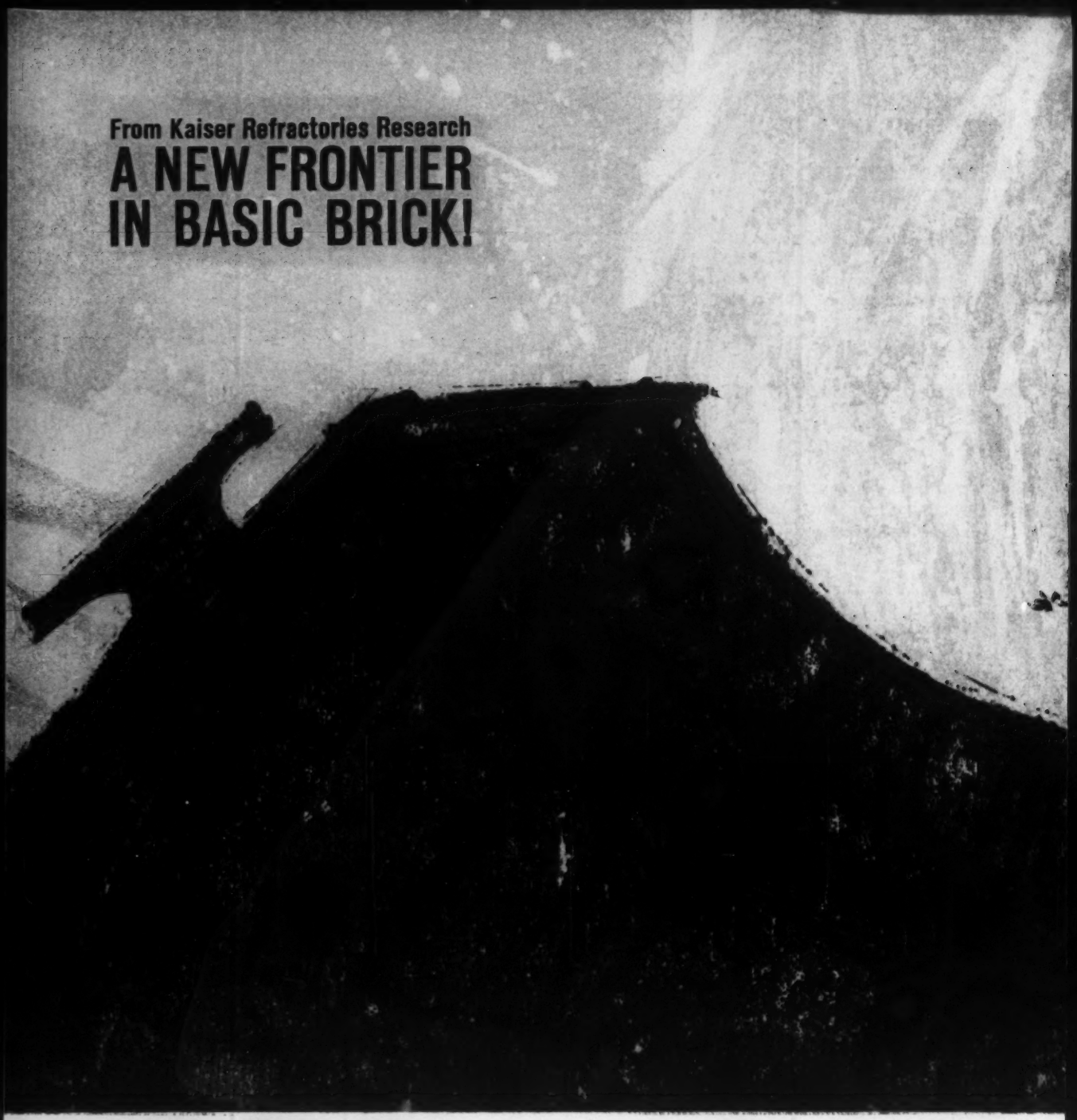
METAL FINISHING MACHINES . . . AND FINISHING METHODS
POWER, PAINT AND MAINTENANCE BRUSHES • FOUNDRY PRODUCTION MACHINERY



From Kaiser Refractories Research

A NEW FRONTIER IN BASIC BRICK!

REVOLUTIONARY PATENTED PROCESS MAKES POSSIBLE THE FIRST HYDRATION-RESISTANT TAR-BONDED BRICK

Pioneering a new brick-forming process that promises to revolutionize the manufacture of basic brick, Kaiser Refractories Research has developed, patented and proved the industry's first hydration-resistant tar-bonded brick!

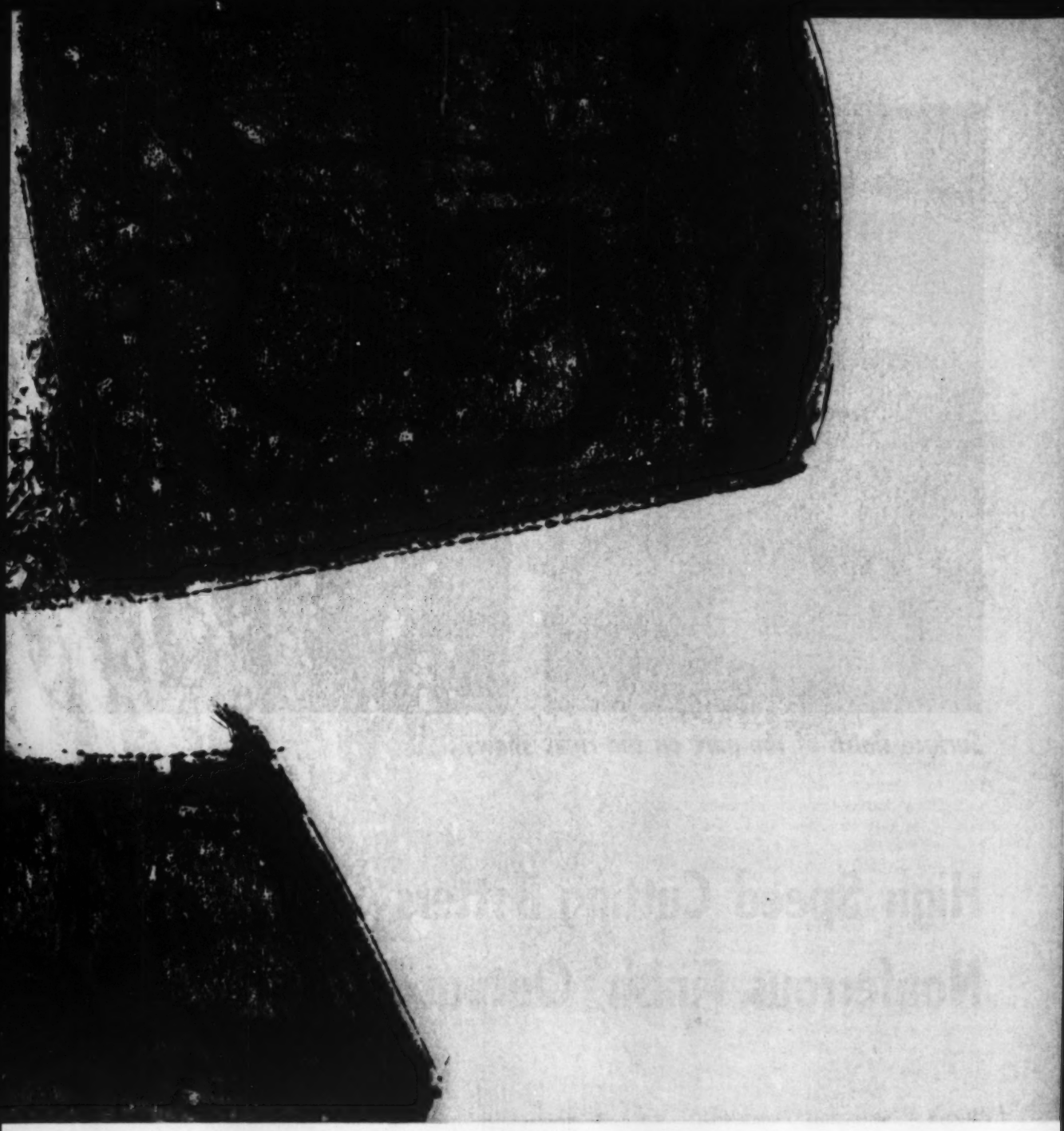
This Kaiser patented process develops such increased properties that it is expected to lead the way to improvements in other types of brick to help reduce steel-making costs.

New Kaiser Tar-Bonded brick are even now helping operators achieve new efficiencies. In one oxygen steel vessel, the brick were installed after four months storage in customer's plant—did not hydrate—went on to deliver 27,812 tons of steel in 256 heats. The next lining—Kaiser Tar-Bonded again—went 30,625 tons of steel in 277 heats. And in another shop, another record broken—53 more heats than the best of the eight previous competitive linings.

These new hydration-resistant Kaiser Tar-Bonded brick are now being produced in specially designed plants at Columbiana, Ohio, and Moss Landing, California.

Pioneering cost savings and performance advances in refractories for steel is an every day job at Kaiser Refractories' two research centers.

For detailed information of these latest advances send for your copy of "A Report on Kaiser Tar-Bonded Refractories."



Use the coupon at right or contact Kaiser Refractories & Chemicals Division, Kaiser Aluminum & Chemical Sales, Inc. (Canadian subsidiary: Refractories Engineering & Supplies, Ltd.)

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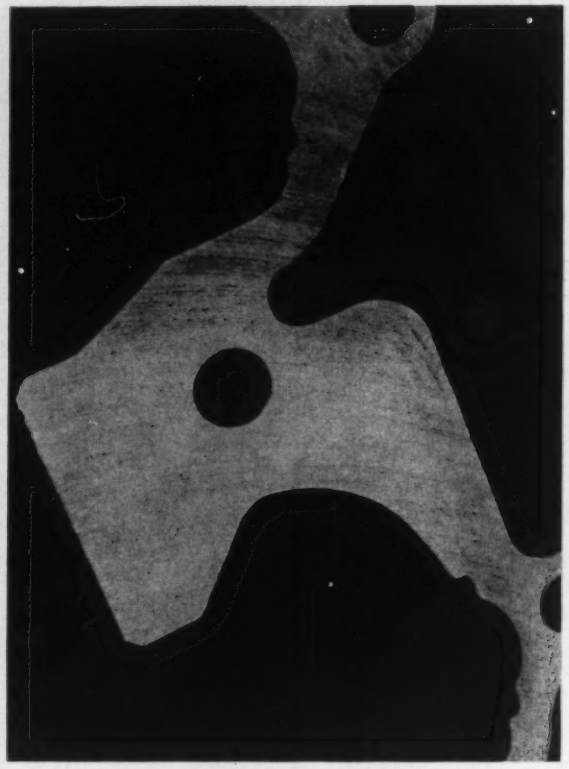


Surface finish of the part on the right shows . . .

High Speed Cutting Betters Nonferrous Finish, Output

PEOPLE machining nonferrous metals are reported to be enthusiastic about high speed machining as an aid in stepping up production and improving product finish. Production efficiency increases up to 1000 per cent are possible, says Onsrud Machine Works Inc., Niles, Ill.

Industries related to airframe manufacture, the first users of the process, helped introduce the technique to makers of such products as appliances, cameras, outboard motors, carburetors, pumps, valves, and carbon components.

• Onsrud defines high speed machining as a process using cutter speeds of 5000 to 10,000 sfpm and spindle speeds of 1800 to 100,000 rpm.

High cutter speeds require proportionately higher feed speeds to maintain a given chip load on each tooth of the cutter. For example, the company says a 6 in. diameter, eight tooth cutter running at 3600 rpm (5400 sfpm) will cut 28,800 chips per minute.

For a chip load of 0.001 in. per tooth, a feed speed of 28.8 in. per minute is required; a 0.002 in. chip load per tooth requires a feed speed of 57.6 in. per minute—and so on up to possibly 0.010 in. per tooth, in which case, a feed speed of 288 in. per minute is required.

The maximum chip thickness depends upon the surface condition desired, machine capabilities, tooling rigidity, and horsepower. Practical limitations: As speed increases, cutter balance and rigidity of machine and tooling become more critical, says Onsrud.

• Tool life depends on such variables as the material, cutting edge geometry, machine rigidity, workholding fixtures, lubrication application methods, chip thickness per cutter tooth, cutter balance, and the grade of carbide being used.

Onsrud says that tool life should be measured by the number of pieces produced per cutter grind rather than cutter running time; the vast difference in production does not make time a proper basis for comparison. The company also

says that cutter life is too often overemphasized.

Since parts can be produced many times faster by using high speed machining methods, Onsrud feels that more than enough money is saved in production time to enable a manufacturer to profitably spend a little more money for cutters and a little more time on their care and grinding.

• There is no reason why chips should become welded to the cutter in high speed machining of aluminum, says the company, since heat is removed almost as fast as it's generated.

At high speeds the cutter is sometimes turning ten times faster than at conventional speeds. As a result, a much smaller chip load per tooth is taken. Mainly because contact time between chips and the cutter is short, the heat problem is reduced.

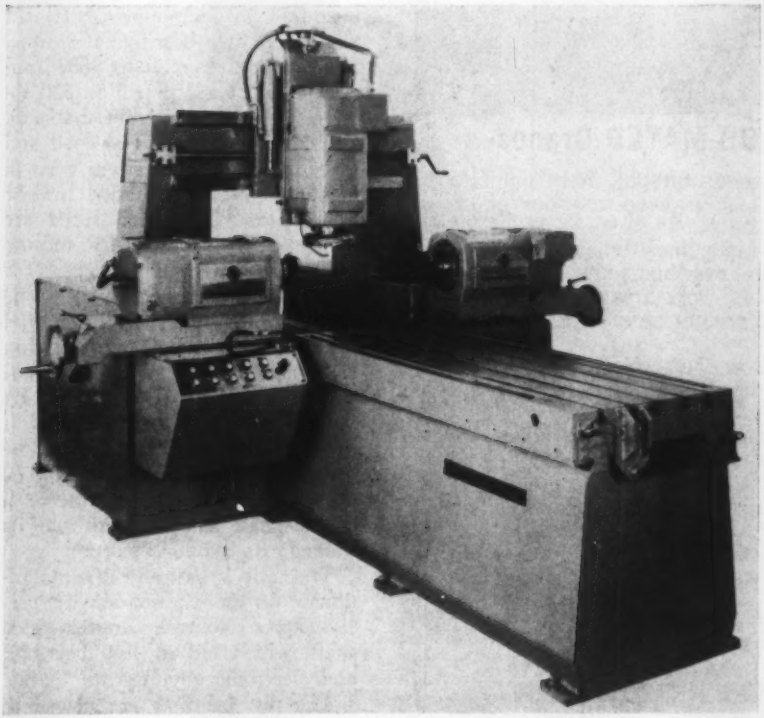
• Coolant is another aid in minimizing the heat problem and also increasing tool life.

Onsrud says method of application is more important than the amount of coolant used or the type. It should be applied on the cutting edges of the cutter where a thin film can reduce friction of the chip sliding over the face of the cutting tool.

But it is not the primary function of the coolant, says Onsrud, to take the heat out of the chip because the chip is thrown clear of the work and the cutter. For that reason, a large volume of coolant is not required.

Onsrud recommends applying coolant with several small high pressure jets spraying at the cutting edge from several points around the periphery of the cutter. It says the jets are accurate and effective. The spray must have sufficient velocity to pierce through the turbulent air surrounding the cutter at high speeds.

When applied properly, a small amount will go a long way and the shower that goes along with a large volume of flood coolant is eliminated, the company says.



THREE SIDES OF A NONFERROUS PIECE CAN BE MILLED TO ±0.0003 in. in one pass on the new Onsrud Tri-Way Mach-Mil. Direct drive motors power the high speed cutter heads. The company says that table speed is not decreased by the three cutters. Chip load per tooth is reported to be low

New Tools and Geometry Speed Turning of Castings

Cutting tools of Carboloy cemented oxide grade 0-30 are being used to turn cast iron by an Ohio company.

The workpieces: Sand cast pistons, and centrifugally cast cylinder liners.

The success of the tool material (produced by the Metallurgical Products Dept., Detroit, of General Electric Co.) is attributed to such factors as tool geometry and machine rigidity.

Machining time is said to be reduced 66 per cent on the cylinder liners. The new tooling makes it possible to turn the 18⅞ in. OD by 46½ in. long liners to the specified 18.525 in. diameter in one cut. Time required: 15 minutes. With other types of cutting tools, two cuts were necessary.

Tool life has also increased; two liners can now be turned per index. And diameter is held within 0.002 in. of specification for the full length of the workpiece. A cutting speed of 950 ft a minute and a feed of 3.12 ft a minute are used with the disposable tool, which has a 1/64 in. wide, negative rake land.

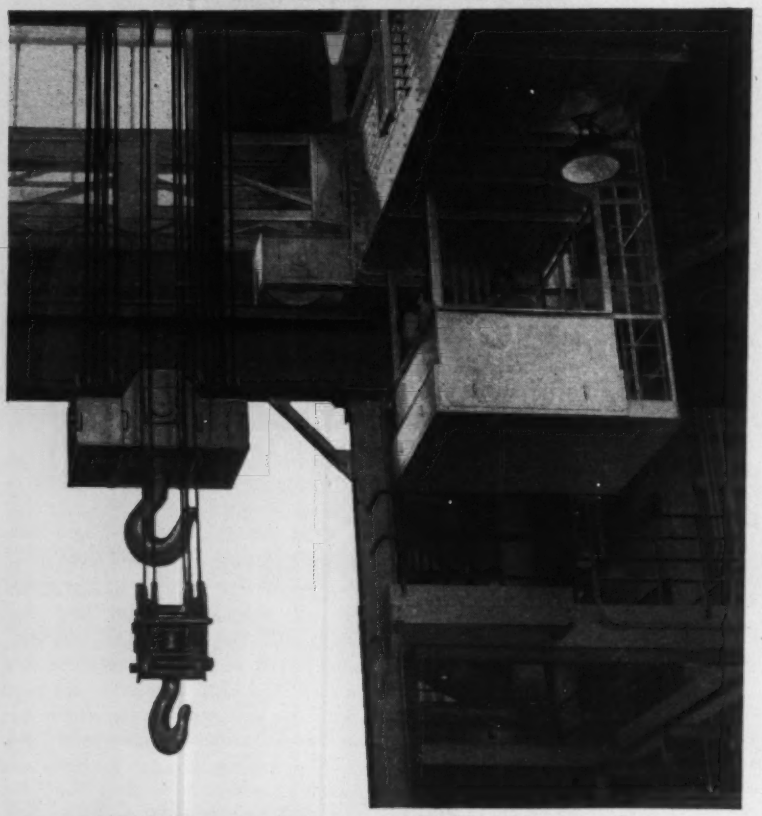
The tooling is said to have cut machining time in half on the 14½ in. OD by 20 5/16 in. long pistons. The castings are turned to semifinish in one cut, 3/16 to 5/16 in. deep. Turning time: 7 minutes.

Speed is 800 ft a minute, with a feed of 2.628 in. per minute. The insert, which has a 1/64 in., negative rake land on all edges, holds a satisfactory finish for eight pieces per tool index.

Cast Crankshafts Adopted

Cast steel crankshafts, made in the shell mold foundry at Evinrude Motors Div., Milwaukee, of Outboard Marine Corp., are being used in most of the corporation's outboard motors and power lawn mowers. The cast shaft is said to reduce costs by decreasing the amount of steel required and eliminating some machining. Other benefits: Greater design flexibility and simplified production schedules.

The Shortest Distance Is OVERHEAD



With Shepard Niles JOB-MATED Cranes

Traveling cranes deliver the goods **directly,** from point to point within your plant or warehouse, or even from one building to another.

They move masses of material faster, more efficiently–speed up production–because they travel **over** obstacles, not **around** them. And they leave passageways, work areas, and grounds free of moving equipment, with greater safety for your employees and materials.

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Bearing Analyzer Ups Performance

IMPROVED performance and higher standards for sleeve and shaft bearings are among benefits a bearing analyzer is expected to produce for Tann Bearing Co., a division of Tann Corp., Detroit.

The unit will permit Tann to determine the effects of design changes on bearing operation, including such factors as material selection and surface finish, types of lubricant, and variations in length to diameter ratios. The unit writes down what it sees on graph paper.

Though incomplete, the company is already using the analyzer for additional research on its Hyfilm packaged bearing that runs on a hydrodynamic oil film. By varying loads and speeds, the company says it can accurately determine the optimum operating conditions for any bearing configuration.

The first stage of the analyzer measures and records the operating temperature of test bearings. It also measures and records the amount of torque consumed in operating the bearing. Results are measured in inch-ounces. It can test one or two bearings at a time, at any speed from 0 to 3500 rpm and at any load from 0 to 200 lb.

The machine can automatically and continuously increase load and speed (one or both) from zero to maximum over any period from 1 to 2 hours. Load and speed are increased with practically infinite resolution.

Additional components, still to be added to the unit will listen and record bearing noise and vibration and measure the effects of shaft misalignment.

Shaft deflection and thickness of hydrodynamic oil films will also be measured. The analyzer will be able to continuously plot the path of the shaft as it moves from its static to its dynamic position.

The unit is basically a combination of an electric motor with precise speed control, an extended shaft which drives test bearings, and electronic circuitry.

The test bearings are placed in a simulated motor housing mount which can duplicate bearing placements of integral horsepower motors with NEMA 184 to 254 frames.

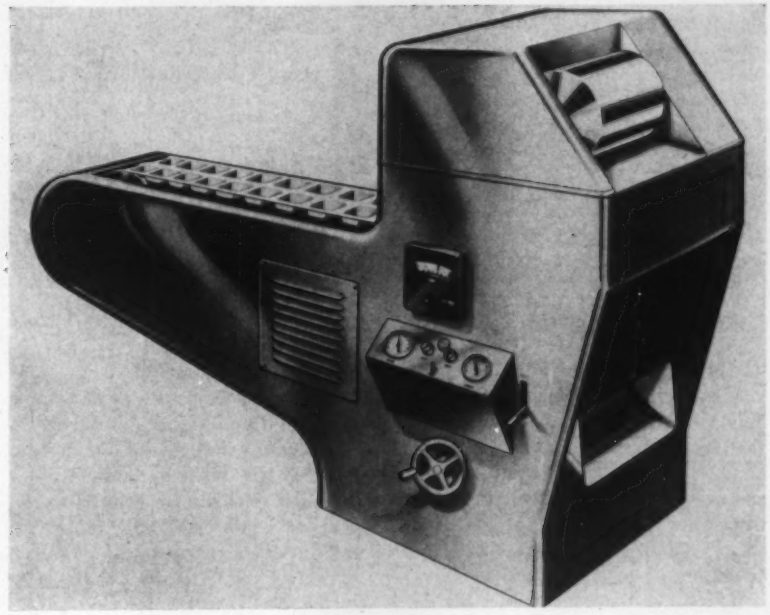
Plastic Blister Packaging Applied Automatically

ALMOST any thermoplastic film can be used in the Pac-O-Vac Model 2400 automatic blister packaging machine. The product to be enclosed is placed in the blister manually or automatically.

The blister is formed from a strip of thermoplastic film supplied from a roll. The strip of filled blisters is sealed to a backing material and cut off into single or precounted multiple packages. The unit can form, fill, and seal blisters in one complete, automatic, operation.

The company says the transparent package provides sealed protection for delicate components or small precision parts. Backing (sealing) may be printed on one or both sides.

For further information, *write* Product Packaging Engineering, 5713 Joanne Place, Culver City, Calif.



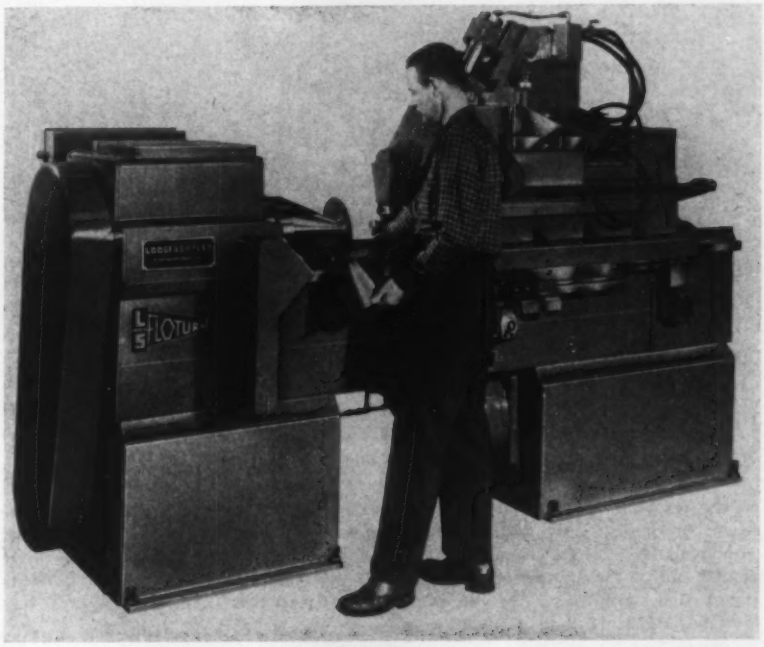
Light Gage Metals Shear Formed with Precision

SHEAR forming of light gage metals into parts such as utensils, light reflectors, cooking and scientific ware, bowls, tumblers, funnels, graduates, and shot glasses can be done on the No. 12 Floturn.

The precision metal forming unit has all hydraulic operation, including automatic hydraulic tracer control of its single forming roller. It can make parts ranging up to 12 in. in diameter and 15 in. long. The machine is about 10 ft long, 4 ft wide, and 6 ft high.

Spindle drive (from a 15 hp, 1200 rpm, Dinabrake motor) is through a V-belt drive with pickoff sheave offering eight spindle speeds from 403 to 1611 rpm (spindle speed).

Features borrowed from the larger units include a rugged headstock with precision oversize bearings and automatic lubrication, automatic cycle operation, yieldable tailstock, reversible roller head, 60 degree roll-



er slide, adjustable feed cams, integral coolant system, and two separate hydraulic systems.

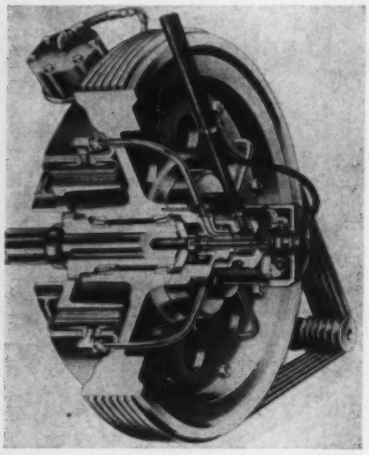
The horizontal machine is simple to operate—a skilled operator is not required. The company says the automatic production cycle under tracer control is easily adaptable to automatic loading and unloading of work.

For further information, *write* Floturn Div., Lodge & Shipley Co., 3055 Colerain Ave., Cincinnati 25, Ohio.

Small Air Clutch, Brake Takes High Speed Cycling

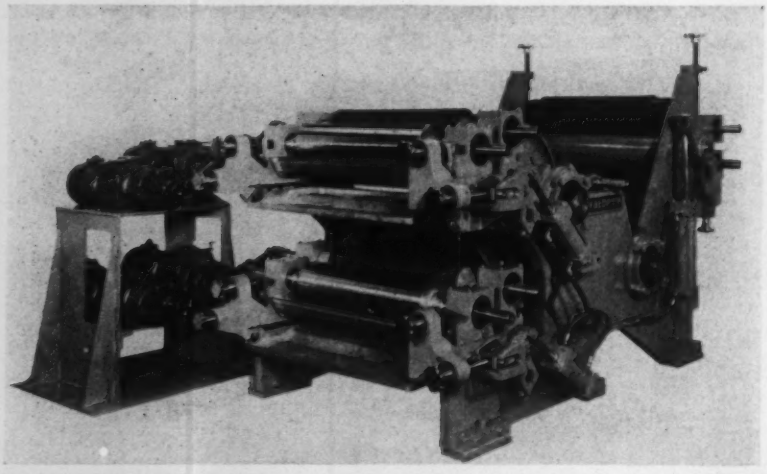
HIGH efficiency power transmission for low tonnage presses is provided by a miniature air clutch and brake package designated FSPA. It's designed for high speed cycling with extremely accurate starts and stops. The clutch portion of the package may be used in pulley mounted applications.

It uses a 6 in. diameter, drum type, air clutch and a 4 in. diameter, self-energizing brake. The company says the miniature FSPA has the same design and performance characteristics as the larger units in the FSPA series.



The clutch has a 360 degree friction surface. It responds instantly to pushbutton control and adjusts automatically for wear. The spring engaged, air released brake automatically engages in case of electrical or compressed air failure to provide fail-safe protection.

For further information, *write* Fawick Airflex Div., Fawick Corp., 9919 Clinton Rd., Cleveland 11, Ohio.

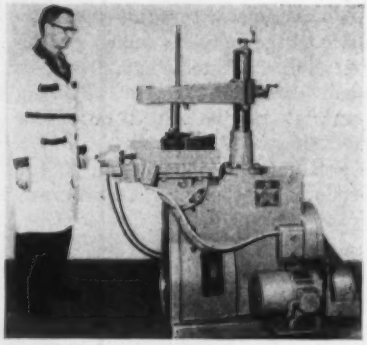


ALKYDS, ACRYLICS, AND VINYLS ARE APPLIED by this heavy duty strip coater. It'll handle the materials in a range of 10 to 90 per cent solvents and strip thicknesses from 0.010 to 0.030 in. It's designed for economy lines producing coated strip in 12, 18, 24, and 30 in. widths at speeds up to 200 fpm. The standard unit includes one top side and one bottom side coating head. The picture above shows an optional, two roll, top side coating head. For further information, **write** Ross/Waldron Divisions, Midland-Ross Corp., Box 791, S. C., New Brunswick, N. J.

Machine Cuts Keyways to 1¼ in. Wide, 9 in. Long

PRECISION keyways up to 1¼ in. wide and 9 in. long can be produced on the improved Model O keyseater. It's designed for use in toolrooms and on low and medium rate production parts.

Keyways are produced with standard, stocked, high speed steel cutters (⅛ to 1¼ in. wide) wedge locked in a cutter bar. The bar travels up and down and is supported at the top by a bushing in an overarm support. The worktable is fed in toward the cutter automatically when the cutter bar is at the top of the stroke. It backs out at the bottom of each stroke to clear the tool.



The unit is powered by a 1½ hp motor. Cutter bar speeds of 15 and 33 strokes per minute are obtained by a V-belt and step pulley arrangement. Table feeds are adjustable from 0.001 to 0.012 in. per stroke. Cutter bar stroke is adjustable from 3¼ to 9 in. by setting an eccentric offset.

For further information, *write* Star Cutter Co., 34500 Grand River Ave., P. O. Box 376, Farmington, Mich.

Versatile Drilling Unit Is Controlled by Tape

QUICK adaptability to single part, short run, or continuous production drilling is a feature of a tape controlled drilling machine developed by Leland-Gifford.

Single part operation can be controlled from the keyboard of the GE Mark II, numerical position-

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Plants at Pittsburgh, Youngstown, Canton, Wilmington

PAR Process thinking removed the IF
... saved 2 operations for DeVilbiss

DeVilbiss had good reason for wanting to replace machine screws as the means of fastening reed type intake valves in the popular TUFFY Paint Spray Compressor. Tapping was needed; an extra operation. Bulky screw heads required making recesses in an adjoining plate; another extra step. And, machine screws could be loosened by the vibrating valve.

Riveting would overcome all the problems, cut costs and increase assembly rate by 20 percent. BUT how could a sufficiently thin, flat rivet head be had, and at reasonable cost?

An ingenious answer came from the TRS man applying his PAR Process approach to the problem. *"We'll design special jaws and a driver, and work out the feeding details so that you can feed standard oval head rivets and flatten them in the setting operation."*

It was successful! From the simplified process, DeVilbiss gets a neat saving, faster assembly and stronger fastenings that are better sealed against leakage. And, of course, rivets cost less to buy.

FIND OUT what the PAR Process can save you

The PAR Process starts with a search by your TRS man for ways to eliminate or simplify and speed up steps in assembly. It is made effective by specially organized TRS procedures, backed by unique TRS developments in rivets and riveting machines.

The PAR Process may bring you better integration and greater automation of assembly operations, or even a cost-cutting change in basic assembly method. Ask for a check of your operations . . . it can be worth dollars to you.

Don't Buy Riveting Machines until you learn how the TRS **PAR** *process revolutionizes riveting*

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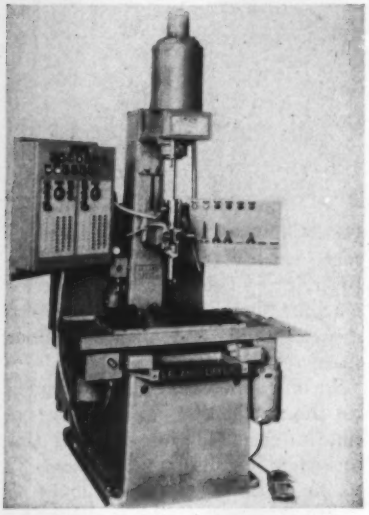
If it's a Tubular Rivet TRS makes it . . . and Better

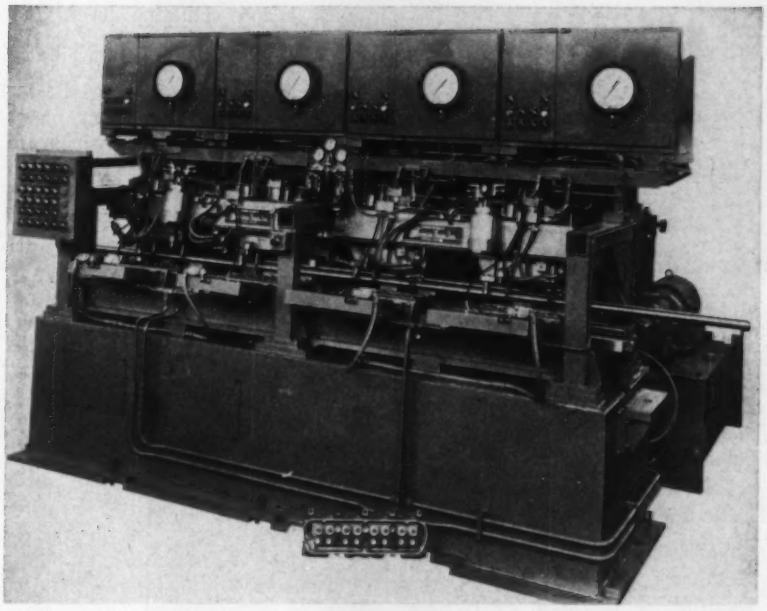
ing control, or the co-ordinates can be dialed on the console mounted on the drilling machine. For repetitive work, standard, eight channel, punched tape is used with a fast tape reader. Programing can include automatic reversal for tapping and instant stops for tool and speed changes as indicated by flash tool change lights.

The compound motion table is traversed hydraulically on ball bearing mounted and guided round ways with high speed positioning by self-contained, closed loop, hydraulic circuits and reversible, GE Thy-Mo-Trol controlled, motor driven pumps. Positioning accuracy is ±0.001 in., nonaccumulative, with repeatability of ±0.005 in. The drilling unit incorporates a six station, turret depth stop and a 5 in. traverse hand feed. A choice of spindle speeds in



eight steps from 150 to 1800 or 150 to 3600 rpm is available. Drilling capacity is equivalent to 7/8 in. diameter in cast iron.

For further information, *write* Leland-Gifford Co., Worcester 1, Mass.



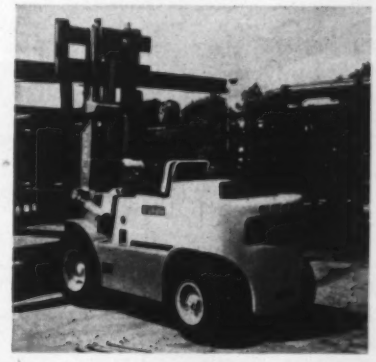
CYLINDER HEADS OR SIMILAR PARTS CAN BE LEAK TESTED on the Turner transfer type air leak test machines. The part is slid into the fixture and hydraulically clamped. During the automatic cycle, a measured amount of air (under pressure) is injected into the part. If the part is defective, a red light appears and a dial also gives a signal. With acceptable parts, a green light appears and the part is marked with paint. Selector switches are provided to check out leak test panels. The unit tests two parts simultaneously for a total of 250 pieces an hour. For further information, **write** Turner Bros. Inc., 2625 Hilton Rd., Ferndale 20, Mich.

Lift Truck Series Rated At 6000, 7000, 8000 lb

THREE gas powered, pneumatic tired, fork trucks of 6000, 7000, and 8000 lb capacities have been introduced by Clark. The units are designated the Clarklift CFY-60, CFY-70, and CFY-80.

The series has a fully synchronized, friction clutch transmission that permits the truck to be shifted from forward to reverse without bringing the unit to a complete stop. The feature eliminates gear clashing and speeds handling operations when frequent direction changes are necessary.

The transmission has a 12 in. diameter single disc, dry plate clutch which can be quickly changed.



Clutch capacity: 390 lb-ft of torque. The machines are powered by a Continental, six cylinder, L-head engine (244 cu in. displacement) rated at 74 hp at 2250 rpm. It develops a maximum torque of 192 lb-ft.

Standard equipment includes power steering, adjustable seat, instrument cluster, and combination lift and tilt control with directional operation.

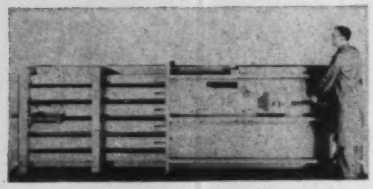
For further information, *write* Industrial Truck Div., Clark Equipment Co., Battle Creek, Mich.

Waste Baler Needs No Special Foundation

NO PIT, special foundation, or anchor bolts are required for the Lake waste baler. Bale size is 72 x 42 x 30 in. Five 13 gage baling wires are used.

The ram makes a complete stroke cycle in 24 seconds. By installing

NEW PRODUCTS and equipment



an electric eye on the feeder hopper and the electric and hydraulic equipment necessary for ram control, the ram will cycle automatically each time the feeder hopper fills with material. Four other sizes of Lake balers are available.

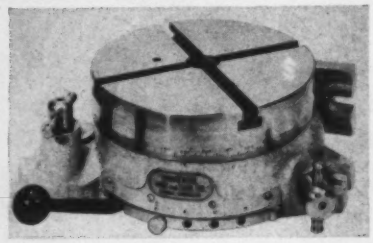
For further information, *write* Lake Engineering Co., 312 Gostlin St., P. O. Box 784, Hammond, Ind.

Precision Spacer Suitable For Production Machining

A PRECISION spacer called Universal Speedi-Spacer is suitable for use on milling, grinding, drilling, and other toolroom and production machining operations.

The standard model features a quick action actuating lever. By changing the selector button, the user has a choice of 2, 3, 4, 6, 8, 12, or 24 divisions without the installation of special masking plates or blockouts. If other divisions are required, special master plates can be furnished to give any selection desired.

The unit is available with a T-slotted platen, plain platen, or chuck. Platen models are 9 in. in diameter. An 8 in. chuck is furnished. The manufacturer says divisional accuracies of 40 seconds or better are obtainable.



After indexing, the unit automatically locks. A special clutch type lock is provided to prevent any deviation or offset during machining. The Speedi-Spacer can be used in the vertical or horizontal position.

For further information, *write* Universal Vise & Tool Co., Parma, Mich.

Fabric Backed Urethane Protects Chute Surfaces

A FABRIC backed urethane to be used as a liner for handling ore slurries, coal, coke, rock, sand, gravel, glass, and other abrasive materials has been developed by Armstrong Cork.

Called Armstrong PO-663, the material provides abrasion resistance, reduces cost by prolonging chute and equipment life, permits use of thinner gage materials, and can be easily installed by cementing or bolting.

It's available in standard stock sheet sizes ranging from 12 x 20 in. to 96 x 40 in. in 1/16, 1/8, and 1/4 in. gages. Other sizes of the urethane material are available.

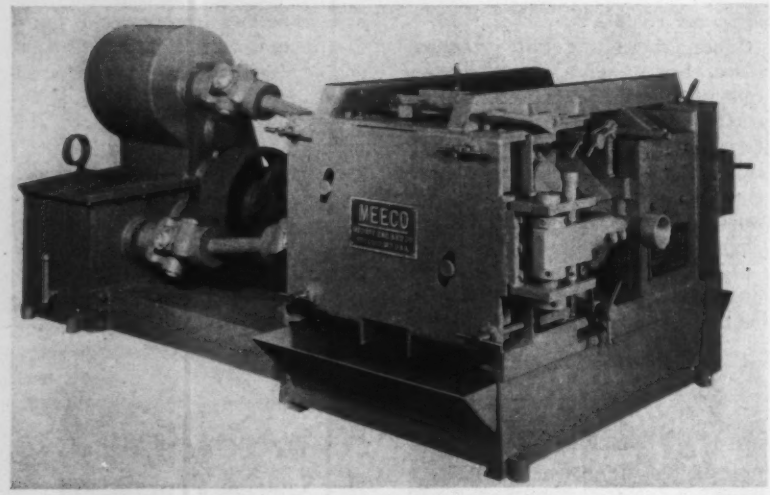
For further information, *write* Armstrong Cork Co., Lancaster, Pa.

Relays Save 50 Per Cent In Machine Panel Space

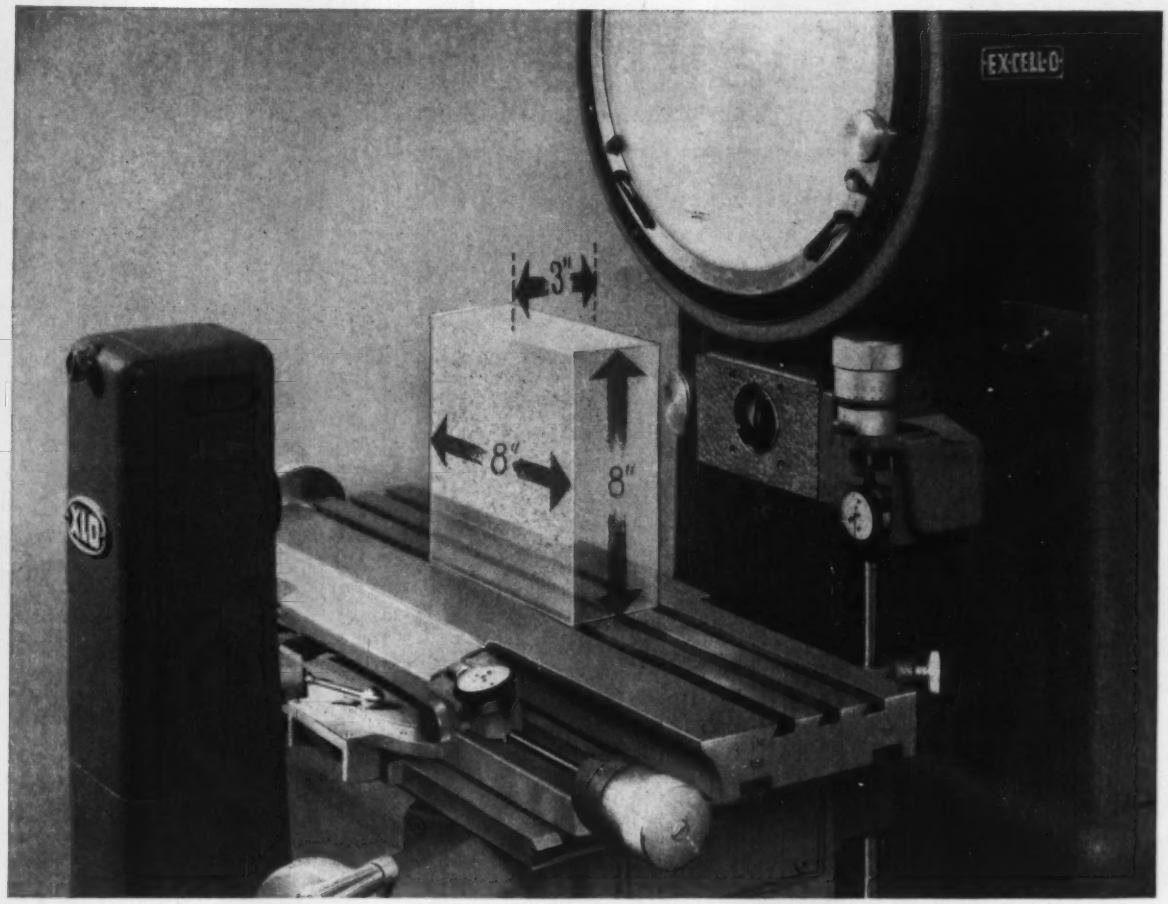
UP TO 50 per cent of control panel space can be saved with the Type BF relay. The unit, designed for machine tool applications, can also make possible reductions in floor space requirements.

In one application being designed for the automotive field, it was possible to reduce a control panel (for an engine transfer line) from 35 to 20 ft in length saving about 40 sq ft. The unit is 3 1/8 in. high and 1 11/16 in. wide and occupies a panel area about the size of a cigaret lighter. It's available in any combination of normally open or normally closed contacts, from two to eight poles, with a maximum of four normally closed. Rated full load current is 6 amperes at 300 volts ac.

The relays can be butted without additional insulation or electrical clearances. All terminals are readily accessible from the front. Clamp type terminals have wire stops and are designed to accept solid or stranded wire, sizes No. 14 through 18. Result: Faster installation. Operating time on pickup is 12.5 to 18



OPEN SIDE GEARBOX AND HEAVY INPUT SWINGING BAR GUIDE are featured on this two roll, continuous, rotary straightening, sizing, and polishing machine. The cross head is held on by six bolts and is easily removed, says the company. Steel weldments form all the parts except the roll yokes (cast iron). The roll yokes surround the rolls up to the center line. The headframe is equipped with a removable scale pan. The unit was developed to accompany a 50,000 lb drawbench (furnished by McKay Machine Co.) for Indian Trades & Finance Private Ltd., Bombay, India. For further information, **write** Medart Engineering & Equipment Co., 100 Potomac St., St. Louis 18, Mo.



EX-CELL-O Contour Projectors Give You 98% More Capacity

Ex-Cell-O Models 14-5 and 30 give you capacity to accept and optically gage much larger parts than is possible with other contour projectors,—*and without repositioning on the table!*

A full 8″ of table travel in both horizontal and vertical planes, together with 3″ of focusing travel is standard on these Ex-Cell-O Models. Every point within this "block" can easily be brought into focus on the screen.

Here is real capacity,—192 cubic inches,—98% *more* than the nearest standard model! Enables users to stage shafts 16″ in diameter, (and larger in some cases), and 16½″ in length on the standard work table with standard centers. Any point along the part contour can be optically gaged with convenient table movement.

"Cubage" isn't the only Ex-Cell-O capacity Plus! You get constant 8″ of working distance (lens to focal plane) —20% more than other standard projectors. Full 8″ of vertical measuring travel. Constant throat clearance, (collimator lens to front projection lens), of 17½″ on the Model 14-5; 16″ on the Model 30;—and Ex-Cell-O's rugged, heavy duty tables enable you to stage parts weighing up to several hundred pounds.

When you are ready to talk about Contour Projectors, compare feature for feature! There is an OGP Representative near you to demonstrate Ex-Cell-O's many PLUS values. Call or write. In the meantime, let us send you "43 Reasons Why EX-CELL-O Contour Projectors are the First Choice of Industry."

You Can Purchase Ex-Cell-O Contour Projectors on Conventional Terms . . . Deferred Payment Plan . . . or Lease With or Without Purchase Option. Select the Plan Best Suited to Your Needs.

Manufactured by EX-CELL-O Corporation at Detroit, Mich.

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Oakite CrysCoat *zinc* phosphate pre-paint treatment provides lasting corrosion resistance beneath paint under all kinds of heavy punishment.

First, it locks paint and steel together. Then, it beats back corrosion at any point of future paint damage. Test panels usually last well over 1,000 hours in salt spray tests—*four times* the 250 hours required by government specifications.

CrysCoat zinc phosphate coatings are easy to control, too. You use only *one* material for make-up . . . the *same* material for up-keep . . . only *one* simple titration test for analysis—no chance to go wrong on material, or with the wrong concentration.

In the family of Oakite CrysCoat processes there are zinc phosphate as well as iron phosphate materials . . . for spray application and for tank dip . . . for room temperature or heated operation. You can count on *all* to give products lasting protection, lasting appeal. But there's a *right* one to match your protection and/or economic requirements. Ask the Oakite man to help you select it. Meanwhile, write for Bulletin F-8979. Oakite Products, Inc., 38H Rector Street, New York 6, N. Y.

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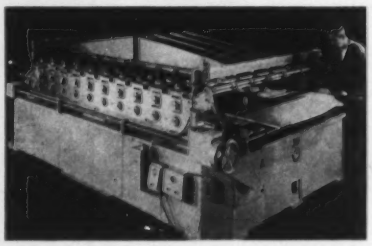
For further information, *write* Westinghouse Electric Corp., P. O. Box 2099, Pittsburgh 30, Pa.

Roll Forming Machine Makes Panels 66 in. Wide

A ROLL forming unit produces steel panels 8 to 66 in. wide, forming both edges in one pass at speeds of 40 to 120 fpm.

Width changes from 8 to 66 in. can be made in 40 seconds. The machine is equipped with a motor driven movable head.



Special features: Quick acting sheet supports placed down the center of the machine to support wide sheets and a Durant visual reading counter which shows the position of the movable head in inches and divisions down to sixty-fourths.

Specifications include direct chain drive with double power takeoff, welded steel frame, steel cut heat treated gears, pressure type lubricating system, and a 10 hp, 3 phase, 440 volt, GE drive motor.

For further information, *write* Maplewood Div., Rockford Machine Tool Co., Rockford, Ill.

NEW literature

Write directly to the company for a copy

Diamond Setting Powders

An engineering data sheet (No. 58) describes Colmonoy diamond setting powders. It discusses the three grades of "compression molding" powder available and outlines recommended applications. Wall Colmonoy Corp., 19345 John R. St., Detroit 3, Mich.

Silicone Mold Release Agents

Silicone release and parting agents are described in Bulletin S-13. Included is a guide to help in the selection of the proper silicone release agent, a description of available material and their typical properties, and suggested techniques for using the agents. Silicone Products Dept., General Electric Co., Waterford, N. Y.

Plating Brighteners, Solutions

Nickel, zinc, and cadmium brighteners for efficient and economical bright still or barrel plating are described in a series of four booklets. Chemical Div., Meaker Co., subsidiary of Sel-Rex Corp., Nutley 10, N. J.

Torque Measuring Instruments

A 12 page brochure illustrates how to measure the torque characteristics and speed of motors, gear trains, servo mechanisms, and potentiometers. Torque ranges from ¼ gm-cm to 200 lb-in. are covered. Power Instruments Inc., 7352 N. Lawndale Ave., Skokie, Ill.

Selective Plating

Varied industrial uses and advantages of a new, high speed selective plating process (Selectron) are discussed in Bulletin SP 1003. The process is a means of plating selected areas of a component without having to immerse the entire object in electrolyte. Selectrons Ltd., 520 Fifth Ave., New York 36, N. Y.

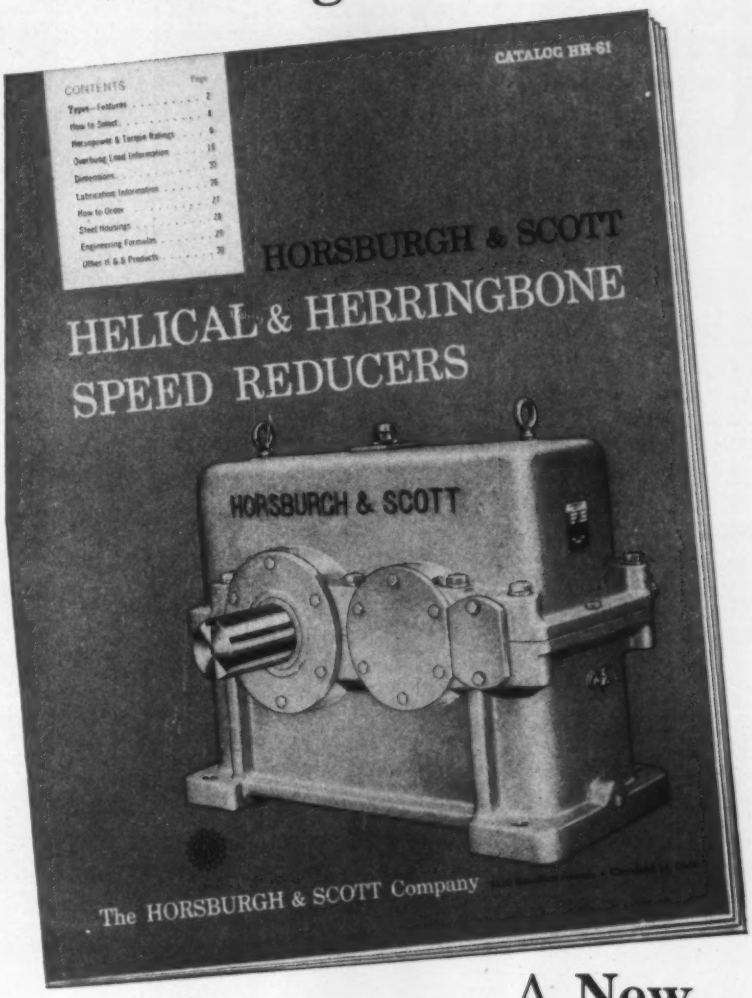
Gray Iron Inoculants

"Inoculants for Production of High-Strength Gray Iron," is a concise treatment of inoculation, including information on its purposes, types of inoculants available, and how to use the technique successfully in the foundry. Vanadium Corp. of America, 420 Lexington Ave., New York 17, N. Y.

Insulation Product Information

Thermal insulations for all types of commercial and industrial requirements, in applications ranging from −400 to 3000° F, are described in a revised 64 page catalog, IN-244A. Information on each product consists of an application photo, description, available forms or types, advantages to users, and detailed specification data, including compliance with government specifications and ASTM standards. Johns-Manville Sales Corp., 22 E. 40th St., New York 16, N. Y.

Introducing . . .



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Hot Rolled Sheets	Alloy Sheets and Plates	Electric Weld Line Pipe
Hot Rolled Pickled Sheets		Spiral Welded Pipe

Uptrend to Continue in April

DESPITE SOME disappointment about the slowness of the steel industry's recovery pace, market analysts aren't retreating from earlier forecasts that April will be better than March.

They're looking for a 6 to 8 per cent increase in production and shipments, sparked mainly by seasonal factors. With better weather, there's bound to be more construction activity, road-building, railroad track maintenance, and work on the farms. Canmakers will need larger quantities of tin plate as they step up production of containers for spring and summer food packs.

RESTRAINED ENTHUSIASM— Although orders booked last week weren't any larger in aggregate tonnage than those entered the two preceding weeks, some sales officials found consolation in noting that the number of orders continued to rise on a daily average basis. That's evidence, they believe, that many customers have stopped cutting their inventories and are coming back into the market.

FAST TAKEOFF UNLIKELY— Because stocks are low and consumption is rising, steel demand is sure to improve in April. But there won't be any great surge. Reason: Inertia on the part of buyers who've been keeping their inventories down for such a long time.

NO HELP FROM AUTOS— There will be little change in automotive steel buying in April. Despite an encouraging pickup in March sales of new and used cars, automakers are scheduling only 415,000 assemblies next month—just 10,000 more than they're expected to make in March. Some steelmen believe the car companies have enough metal in stock, in transit, and on order to finish their 1961 model runs. If so, they may not place any sizable new orders until they're ready to start making next year's cars. There's one bright note: Ford Motor Co. says it will build 25 per cent more cars in the second quarter than it did in the first.

FAVORABLE SIGNS— Aside from autos, most steel consuming sectors of the economy will be moving upward in April if January-February statistics point to trends. January orders for industrial material handling equipment were 6 points above December's. In February, a six month decline in industrial production was halted; orders for durable goods rose; and housing starts increased for the second month in a row.

MANY PRODUCTS GAINING— Despite the weakness in automotive steel buying, demand for cold rolled sheets is inching upward. Tin plate and galvanized items are benefiting from seasonal trends. March orders for plates and structurals were about 5 per cent above February figures. Major oil companies are running low on tubing and casing. Some have already placed orders for the second quarter. That's noteworthy after months of hand-to-mouth buying.

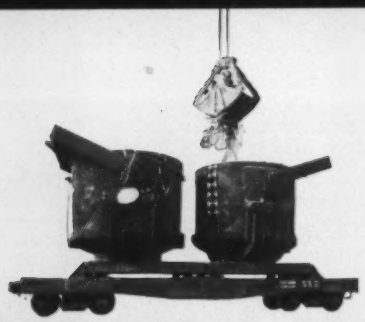
EXPORTS, IMPORTS DROP— January exports of steel mill products fell to 132,000 net tons (from 162,000 in December) and were the lowest of any month since December, 1959. Value: $30.2 million. British and German automakers are turning out fewer cars and consequently buying smaller tonnages of cold rolled sheets. January imports of mill products skidded to 145,000 tons (from 189,000 in December) and were the lowest of any month since June, 1958. Value: $19.4 million.

STEELMAKING STEADY— Look for ingot production in the week ending Apr. 1 to equal the 1,574,000 tons that STEEL estimates the industry poured in the week ended Mar. 25.

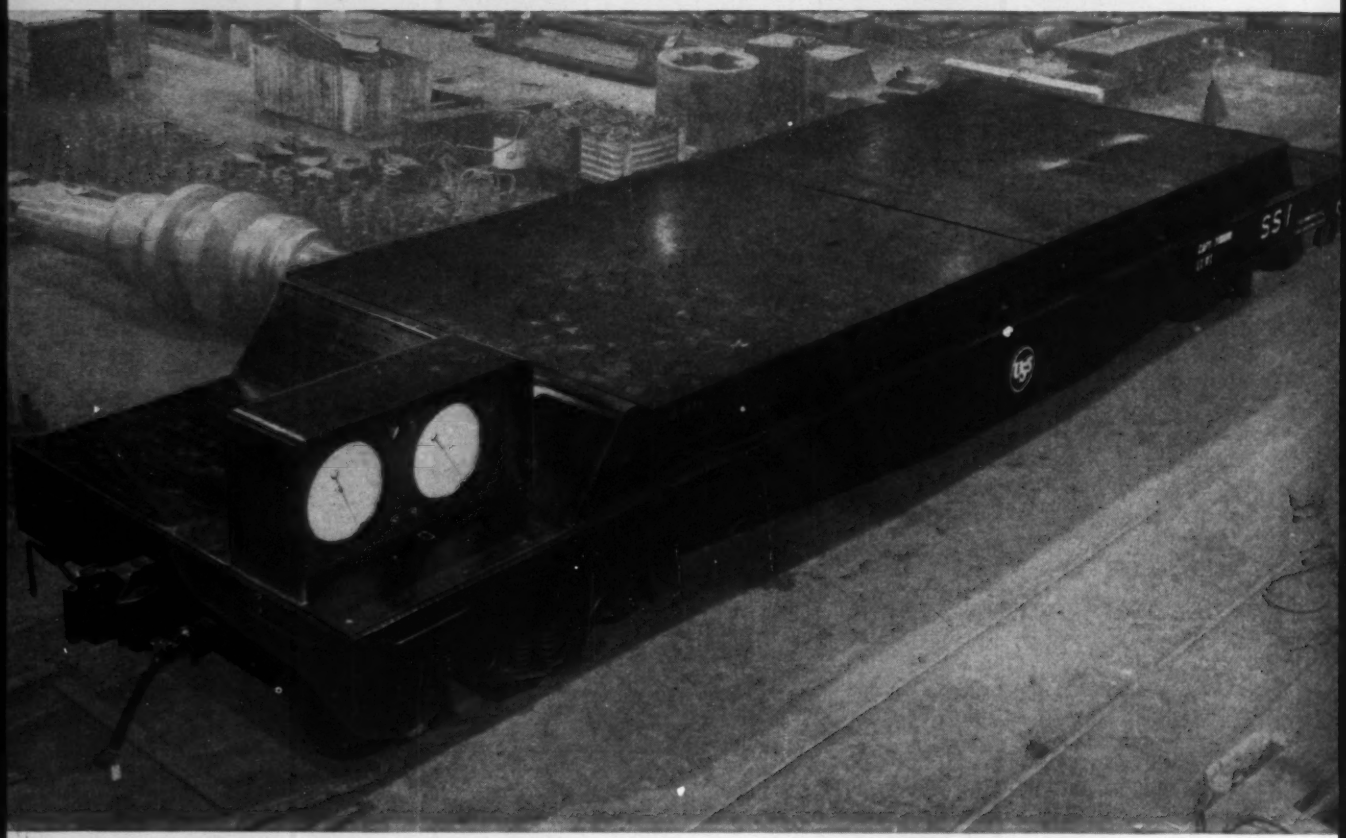
WHERE TO FIND MARKETS & PRICES

	News	Prices
Bars, Merchant	201	204
Reinforcing	...	205
Boiler Tubes	...	207
Canada	200	210
Charts:		
Finished Steel	...	203
Ingot Rate	202	...
Scrap Prices	...	212
Clad Steel	...	208
Coal Chemicals	...	210
Coke	...	210
Comparisons	...	203
Contracts Placed	219	...
Contracts Pend.	219	...
Electrodes	...	210
Fasteners	...	207
Ferroalloys	...	211
Fluorspar	...	210
Footnotes	...	207
Imported Steel	...	210
Ingot Production	202	...
Metal Powder	...	210
Nonferrous Met.	216	218
Ores	213	210
Pig Iron	201	209
Piling	...	204
Plates	201	204
Plating Material	...	219
Prestressed Strand	...	207
Price Indexes	...	203
Producers' Key	205	...
R.R. Materials	...	207
Refractories	...	210
Scrap	212	214
Semifinished	...	204
Service Centers	213	209
Sheets	201	205
Silicon Steel	...	206
Stainless Steel	...	208
Strip	201	206
Structurals	213	204
Tin Mill Prod.	200	206
Tool Steel	...	208
Tubular Goods	...	208
Wire	...	206

This mark tells you a product is made of modern, dependable Steel.



this car is a traveling all-purpose weigh platform



At McLouth Steel, stainless scrap is loaded and weighed to within two-tenths of one percent accuracy. This double operation, performed right in the yard, cuts handling time in the mill and gives them better control of charging mixtures.

Weigh anything up to 100 tons, anywhere on the track, with this new, all-purpose weigh car. It can handle one 100-ton load or two 50-ton loads to within two-tenths of one percent accuracy. You can use it anywhere because the load cells are hydraulically operated and need no power. A weigh car pays for itself by eliminating guesswork and human error.

The McLouth Steel Corporation, Detroit, Michigan, uses this weigh car to predetermine the exact weight of stainless steel scrap and other expensive alloying ingredients. They cut handling time because weighing is done right in the yard. Weight records give them better control of inventory and charging mixtures and make it easier to find the yield cost. Other steel producers cut costs by weighing electric furnace charges and products to control yields. This all-welded, stress-relieved steel car will stand up in all of these uses and give long, dependable service.

USS Weigh Cars and other industrial cars are built to last by United States Steel, a company that also *uses* them! We can custom design and build any type weigh car to best suit your needs. Send your weight problems to United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania. United States Steel Corporation, Pittsburgh · Columbia-Geneva Steel, San Francisco · Tennessee Coal & Iron, Fairfield, Alabama · United States Steel Export Company

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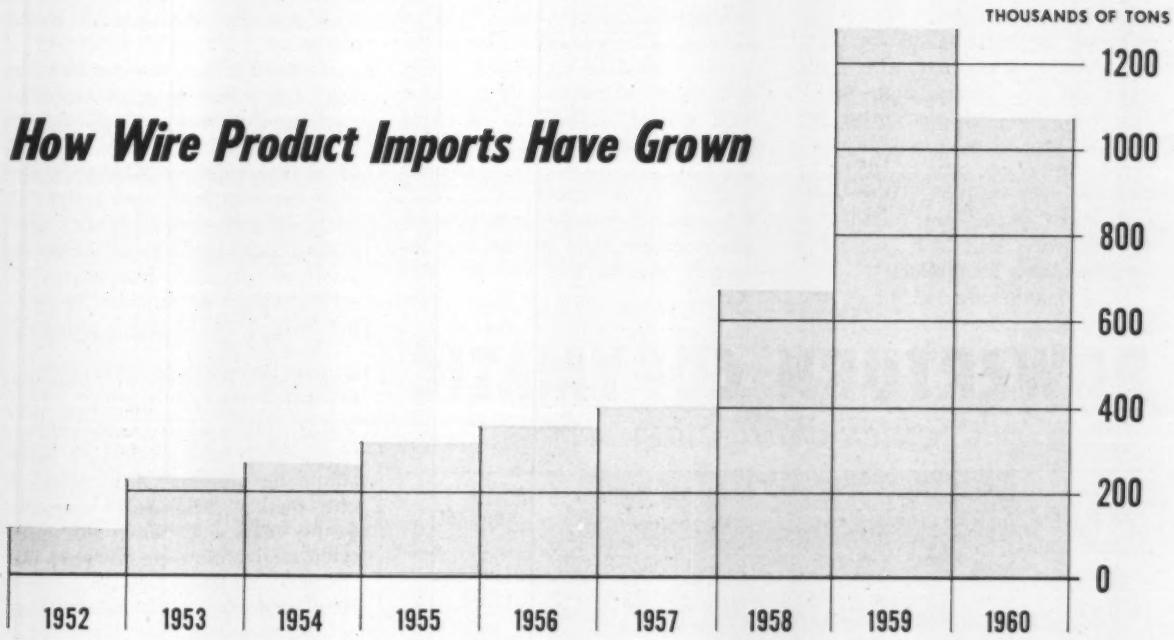

Wiremen Fighting to Hold Markets

BY CONCENTRATING more on the production of high quality grades of wire and specialties, U. S. wiremakers are seeking to offset market inroads of foreign producers at home and abroad. U. S. mills are stressing quality, service, and deliveries. They're also developing new wire products and diversifying and broadening their end product range.

Many think that the solution of foreign competition problems depends upon constructive federal action. They urge import quotas, rather than higher tariffs, and suggest removal of trade barriers abroad that hamper U. S. exports.

Others advocate another route: Constant increases in productivity (to lower costs), continuing improvement in product attractiveness (quality, design, packaging), and dedicated attention to service (better marketing).

• **Some Exceptions**—Generally, the wiremakers haven't discontinued production of any one of the standard wire products. That's the area (particularly wire rods, fencing, barbed wire, and nails) where competition is most severe, forcing drastic curtailment of operations and employment.

There are some exceptions. One producer (answering a STEEL survey) said foreign competition had forced him to discontinue production of certain merchant items, resulting in the elimination of a considerable number of jobs. Another said he has had to virtually discontinue production of wire rods for the manufacture of welding wire, rods and wire for welded mesh, rods and wire for common nails, and rods and wire for garment hangers.

• **Most Hold On**—The rest of the respondents said they had not abandoned a single product, but extremely low sales of some items had forced them to curtail operations and employment; profit margins had vanished, or were emaciated.

Wire product imports fell about 17 per cent last year compared with 1959's (1,071,062 net tons, valued at $166,658,536, vs. 1,285,292 tons, valued at $185,198,176 the year before). But the total was the second largest on record (see chart),

Imports of Wire Products

(Net tons)

Items	1953	1959	1960
Wire rods	65,415	447,747	408,216
Round wire ..	17,485	236,506	206,661
Fencing wire..	413	34,337	23,954
Wire fencing .	3,029	44,703	27,954
Tele. wire	171	2,875	3,015
Flat wire	33,904	53,018	49,145
Wire nails	39,265	304,816	231,759
Barbed wire ..	16,090	78,287	52,973
Wire rope	2,710	19,629	18,942
Wire strand ..	1,616	22,226	17,058
Staples	908	10,115	7,763
Bale ties	42	1,939	1,033
Cotton ties ...	46,242	29,094	22,594
Totals	227,290	1,285,292	1,071,062

despite declines in all wire categories except telephone and telegraph wire.

• **Three Products Lead** — Wire rods, round wire, and wire nails were the top imports both years. The three products accounted for 78.5 per cent of wire imports compared with 77 per cent in 1959 and 53.5 per cent in 1953. Wire rods represented 38 per cent, round wire 19, and wire nails 21.5 (see table for breakdown by products).

U. S. manufacturers, hoping the downtrend in imports will continue this year, are encouraged by reports that some distributors are becoming disillusioned with foreign products and services. Some sellers of barbed wire, fencing, nails, and other merchant items, have been getting a third or more of their stocks from abroad in recent years.

• **Spread Narrows**—Now it seems many distributors are having inventory trouble, and they are dismayed by the long delivery times quoted on foreign shipments. Furthermore, in some cases, the price gap between domestic and foreign wire products has slimmed appreciably.

Wiremakers are working hard to win back orders by aggressively upgrading old lines and developing new products. Quality is being lifted wherever possible, including such items as field fencing, specialty nails, and manufacturers' wire. Some firms are concentrating on products in the higher carbon ranges; others are broadening product lines.

• **Seeking Products** — Specialties are being stressed, including high carbon spring wire, special purpose high carbon wire, chain link fence, automatic welding wire, scrapless nut quality and cold extrusion quality rods and wire, aluminum cable steel reinforcement wire, mechanical and upholstery spring wire. New products include plastic coated and aluminized wire, and welded wire fabric. The search for new products is being pressed relentlessly.

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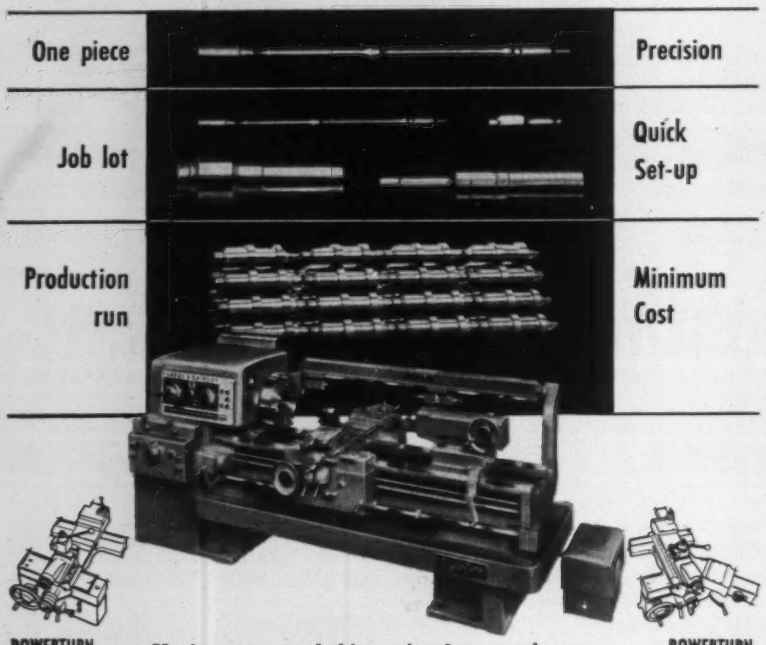

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Canadian Steel Rate Pushed Up by Demand

Canada's steel industry is getting a good push from demand for material to build natural gas pipelines in the west. January-February operating rates exceeded those in any year except early 1960, when production was abnormally high because of the strong demand resulting from the U. S. steel strike.

Production hit 91.6 per cent of capacity in the week ended Mar. 11, up from 84.7 per cent the week preceding and 86.8 per cent two weeks before. The rate was the best of the year to that date.

February production of 470,451 tons of steel ingots was down from 1960's 544,720 tons, but it was well ahead of 1959's 431,921 tons.

Tin Plate . . .

Tin Plate Prices, Page 206

The U. S. Steel Corp. has eliminated the 10 cents per base box differential on tin mill products quoted by its producing subsidiaries at Fairless, Pa., and Fairfield, Ala.

Effective Mar. 18, mill base prices for electrolytic and hot dipped tin

plate, black plate, and ferrolite tin coated thin tin plate, were reduced to the same levels as quoted at Irvin, Pa., and Gary, Ind. (see Page 206).

The corporation also announced prices and availability of two new differentially coated Ferrostan grades. The new coating weights offer users new price economies.

Tin plate is in strongest demand of all the major finished steel products. One Midwestern producer has closed his books on the product on shipments through April.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 205 & 206

Mill shipments of hot rolled sheets hold at two to three weeks, on cold rolled at two to five weeks. Galvanized deliveries range four to five weeks, reflecting a seasonal pickup in demand. In general, demand for hot and cold rolled sheets is moderately better; business is developing from diversified consuming lines.

Autobuilders have not made any more order cutbacks. But they haven't contributed anything important to current demand. Virtually all the gain in volume recently has come from almost every consuming area except automotive, and not much is expected from the autobuilders in April, even though retail sales of cars should improve substantially.

The typewriter industry, a heavy user of strip steel, last year shipped 1,191,000 units, valued at $193 million, vs. 1,283,000 units valued at $191 million in 1959.

Steel Bars . . .

Bar Prices, Page 204

Bliss & Laughlin Inc. reports its orders for cold finished bars last week were the best in a 14 month period. Incoming business is spread over all industries and from all the areas the company serves except Detroit. Warehouses are also increasing their buying.

Pig Iron . . .

Pig Iron Prices, Page 209

Merchant pig iron is moving at a little faster pace. March order volume will show a gain over that in February because of the greater number of days in the month and the larger tonnage moving on a daily basis.

Plates . . .

Plate Prices, Page 204

Sheared and universal plate shipments still hold at ten days to two weeks, but there is a little tightening in deliveries of plate specialties at around three to five weeks. That applies to alloy plates, heads and flanges, and reflects expanding specifications for missiles and other space requirements, plus growing needs of the chemical and food processing industries.

The Pennsylvania Railroad is beginning to place steel for its car repair program. Shipwork continues spotty, and no appreciable pickup in line pipe construction is noted. Ship construction and repairs at both Navy and private yards in the Pacific Northwest are calling for normal tonnages of plates. Some ship construction is underway at British Columbia plants.

About 39,000 tons of steel will be required for five tankers awarded by Texaco Inc. to the Sparrows Point (Md.) Shipyard of the Bethlehem Steel Co.

The Pangborn Vibratory Finishing Machine

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"Every day we find new pieces it can finish," comes the word from the large, Midwestern die-casting firm shown above. And no wonder!

This machine makes itself useful in many ways: cleaning, descaling, radiusing, fine-finishing, burnishing or coloring. It can do all this with metals, alloys, many types of plastic and ceramic parts . . . and at speeds up to 100 times faster than conventional methods. It cleans the intricate or shielded surfaces you can't reach with barrel finishing or other means.

Available in many sizes, the Pangborn Vibratory Finishing Machine is the most compact unit in its field. Its standard equipment includes variable speeds and an exclusive air-cushioned suspension which assures automatic leveling and amplitude control. Auxiliary equipment, media and compounds available for every need.

Send parts with exact finish specifications or finished specimen, for sample processing in our laboratory to: Mr. William E. Brandt, Pangborn Corporation, 1600 Pangborn Blvd., Hagerstown, Md. *Manufacturers of Dust Control, Blast Cleaning and Vibratory Finishing Equipment—Rotoblast® Steel Shot and Grit.®*

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OF HAGERSTOWN

Steel Rate Shows Little Change from Week to Week

SEASONAL improvement in demand for finished steel products has not pushed the ingot rate up to any appreciable extent. STEEL estimates production this week (ended Mar. 25) will approximate the 1,574,000 net tons estimated by the American Iron & Steel Institute for the week ended Mar. 18. That estimate showed an increase of 0.1 per cent over output in the week ended Mar. 11.

Production is headed upward at some points, but at others it is showing little change from week to week. In general, steelmakers say incoming orders are creeping up slowly and that the seasonal pickup is gaining momentum later than had been expected. Production at most steel centers, as a result, is likely to rise slowly.

• **Pittsburgh**—Not much change in operations is indicated here for the next week or so. Output in the latest week of record was 310,733 tons, and it's expected the furnace melt will hold around that level until sometime in the second quarter.

• **Buffalo**—Based on the number of open hearths in use, ingot operations here range around an estimated 31.8 per cent of capacity (based on 1960 capacity rating).

• **Philadelphia**—Further edging up in ingot production is anticipated this week. For the week ended Mar. 18, output advanced 2 points, pushing the district index to 89.

• **Youngstown**—Youngstown Sheet & Tube Co. relighted three open hearths at its Campbell Works last week, ending a three week shutdown for construction work. The move boosted district production sharply. The increase will be temporary, however, since the Brier Hill Works is scheduled to suspend for repairs this week. District output in the latest week of record was 107,088 tons.

• **Cleveland**—Ingot output has held between 62,000 tons and 72,000 tons weekly for the last month. No big change is anticipated until automakers return to the market with substantial orders.

• **Chicago**—Steelmaking operations here have eased about 1 percentage point to an estimated 62 per cent of capacity on the basis of the 1960 capacity rating. Incoming orders are steady, indicating the production dip reflects mostly an adjustment in output for raw material inventory.

• **Cincinnati** — Ingot operations in this district continue to trend upward. For the week ended Mar. 25, production is forecast at 69,486 tons, up from the 67,245 produced in the week ended Mar. 18. While there has been no strong surge in new orders, district mills report a steady upswing in demand.

• **Birmingham**—The ingot rate for this district is estimated by STEEL at 56.5 per cent, based on the 1960 capacity rating. Output for the week ended Mar. 18 was 100,808 net tons.

• **St. Louis** — Steelmakers say production continues to head toward higher levels, though the change in output from week to week is small. Production in the latest week of record (Mar. 18) was 53,076 net tons, virtually unchanged from the preceding week's 53,601 tons.

• **Western District**—Operations in this area have edged up to 67 per cent (based on 1960 capacity rating). The rise is due mainly to a 17 per cent increase in operations by Colorado Fuel & Iron Corp., now reported engaged at 80.9 per cent.

Alloy Steel . . .

Alloy Steel Prices, Page 204

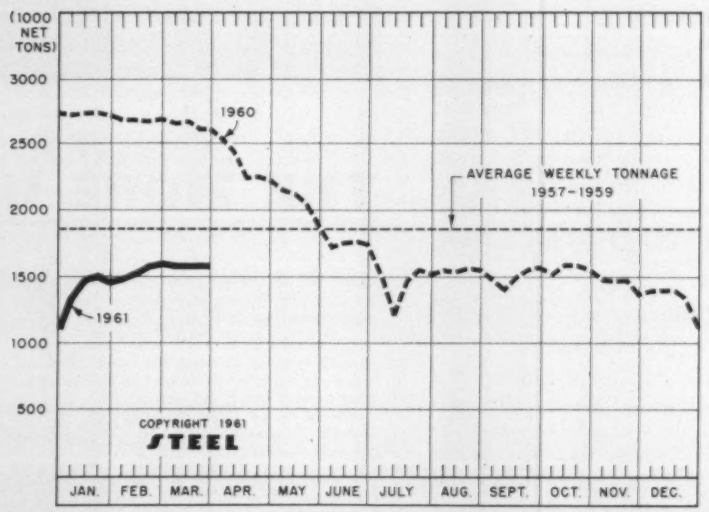
International Nickel Co. Inc., subsidiary of International Nickel Co. of Canada Ltd., has introduced an 18 per cent nickel alloy steel developed at its research laboratory in Bayonne, N. J. The alloy is said to pave the way for a new family of high strength steels with advanced engineering design possibilities for civilian and defense applications. The alloy meets exceptionally high pressure and stress requirements.

STEEL INGOT PRODUCTION

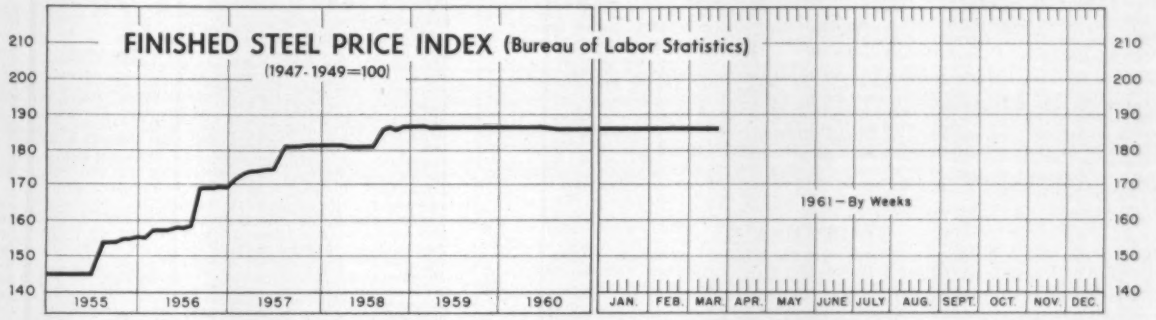
Weeks Ended	Net Tons	Change
Mar. 25	1,574,000*	0
Mar. 18	1,574,000	+ 0.1%
Mar. 11	1,573,000	— 0.4%
Totals to Mar. 18		
1961	16,715,000	—43.4%
1960	29,526,000	

DISTRICTS	Week Ended —Mar. 18— Tons‡	Index†	Week Ended Mar. 11 Index†
Northeastern	237,804	89	87
Buffalo	65,228	67	71
Pittsburgh	310,733	77	79
Youngstown	107,088	63	62
Cleveland	62,039	67	70
Detroit	94,425	90	90
Chicago	347,891	93	93
Cincinnati	67,110	89	86
St. Louis	53,076	101	102
Southern	100,808	93	91
Western	121,589	108	103
Industry	1,574,000	84.5	84.4

*Estimated by STEEL. †1957-59=100.
‡District tonnages are approximate and will not necessarily add to the national total.



Price Indexes and Composites



Mar. 21, 1961	Week Ago	Month Ago	Feb. Index	Year Ago
186.2	**186.2**	**186.2**	**186.2**	**186.8**

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Mar. 21

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825
Rails, Light, 40 lb	7.292
Tie Plates	6.875
Axles, Railway	10.175
Wheels, Freight Car, 33 in. (per wheel)	62.000
Plates, Carbon	6.350
Structural Shapes	6.167
Bars, Tool Steel, Carbon (lb)	0.560
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400
Bars, Tool Steel, H.R. Alloys, High Speed, W18 Cr 4, V 1 (lb)	1.895
Bars, H.R., Alloy	10.775
Bars, H.R., Stainless, 303 (lb)	0.543
Bars, H.R., Carbon	6.675
Bars, Reinforcing	6.335
Bars, C.F., Carbon	10.710
Bars, C.F., Alloy	14.125
Bars, C.F., Stainless, 302 (lb)	0.570
Sheets, H.R., Carbon	6.350
Sheets, C.R., Carbon	7.300
Sheets, Galvanized	8.775
Sheets, C.R., Stainless, 302 (lb)	0.658
Sheets, Electrical	12.625
Strip, C.R., Carbon	9.489
Strip, C.R., Stainless, 430 (lb)	0.480
Strip, H.R., Carbon	6.250
Pipe, Black, Buttweld (100 ft)	19.495
Pipe, Galv., Buttweld (100 ft)	23.098
Pipe, Line (100 ft)	195.430
Casing, Oil Well, Carbon (100 ft)	201.080
Casing, Oil Well, Alloy (100 ft)	315.213
Tubes, Boiler (100 ft)	51.200
Tubing, Mechanical, Carbon (100 ft)	27.005
Tubing, Mechanical, Stainless, 304 (100 ft)	194.268
Tin plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100
Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800
Black Plate, Canmaking Quality (95 lb base box)	7.900
Wire, Drawn, Carbon	10.575
Wire, Drawn, Stainless, 430 (lb)	0.665
Bale Ties (Bundles)	7.647
Nails, Wire, 8d Common	9.433
Wire, Barbed (80-rod spool)	8.372
Woven Wire Fence (20-rod roll)	20.910

STEEL's FINISHED STEEL PRICE INDEX

	Mar. 22 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	247.82	247.82	247.82	247.82	209.10
Index in cents per lb	6.713	6.713	6.713	6.713	5.665

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT	$149.96	$149.96	$149.96	$149.96	$128.02
No. 2 Fdry, Pig Iron, GT	66.49	66.49	66.49	66.49	58.99
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	58.49
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	59.77
Steelmaking Scrap, GT	38.67	37.67	34.00	34.00	49.83

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Mar. 22 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.675	4.65
Bars, H.R., Chicago	5.675	5.675	5.675	5.675	4.65
Bars, H.R., deld., Philadelphia	5.98	5.98	5.98	5.975	4.93
Bars, C.R., Pittsburgh	7.65	7.65	7.65	7.65	6.25
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.50	4.60
Shapes, Std., Chicago	5.50	5.50	5.50	5.50	4.60
Shapes, deld., Philadelphia	5.745	5.745	5.745	5.77	5.00
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.50
Plates, Chicago	5.30	5.30	5.30	5.30	4.50
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	4.80
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.50
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	4.80
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.325
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.325
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.275	5.325
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	5.325
Sheets, C.R., Detroit	6.275	6.275	6.275	6.275	5.325-5.425
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.875	5.85
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.325
Strip, H.R., Chicago	5.10	5.10	5.10	5.10	4.325
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	6.25
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	6.25-6.35
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	6.35
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	6.60
Nails, Wire, nonstock, Pitts.	8.95	8.95	8.95	8.95	7.60
Tin Plate (1.50 lb)box, Pitts.	$10.65	$10.65	$10.65	$10.65	$9.45

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$84.50
Wire rods, 7/32-9/32" Pitts.	6.40	6.40	6.40	6.40	5.375

PIG IRON, Gross Ton	Mar. 22 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$59.50
Basic, Valley	66.00	66.00	66.00	66.00	58.50
Basic, deld., Philadelphia	70.18	70.18	70.18	70.07	62.16
No. 2 Fdry, Nevillelsland, Pa.	66.50	66.50	66.50	66.50	59.00
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	59.00
No. 2 Fdry, deld., Phila.	70.68	70.68	70.68	70.57	62.66
No. 2 Fdry, Birmingham	62.50	62.50	62.50	62.50	55.00
No. 2 Fdry (Birm.), deld., Cin.	70.20	70.20	70.20	70.20	62.70
Malleable, Valley	66.50	66.50	66.50	66.50	59.00
Malleable, Chicago	66.50	66.50	66.50	66.50	59.00
Ferromanganese, net tons†	245.00	245.00	245.00	245.00	205.00

†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$34.50	$34.50	$31.50	$34.50	$49.00
No. 1 Heavy Melt, E. Pa.	43.00	42.00	39.00	36.00	51.00
No. 1 Heavy Melt, Chicago	38.50	36.50	31.50	31.50	49.50
No. 1 Heavy Melt, Valley	36.50	36.50	32.50	36.50	55.50
No. 1 Heavy Melt, Cleve.	33.50	33.50	29.50	33.50	52.50
No. 1 Heavy Melt, Buffalo	29.50	29.50	27.50	31.50	47.50
Rails, Rerolling, Chicago	60.50	58.50	54.50	53.50	66.50
No. 1 Cast, Chicago	44.50	42.50	41.50	45.50	48.50

COKE, Net Ton					
Beehive, Furn., Connlsvl.	$15.00	$15.00	$15.00	$15.00	$14.125
Beehive, Fdry., Connlsvl.	18.25	18.25	18.25	18.25	16.50
Oven, Fdry., Milwaukee	32.00	32.00	32.00	32.00	27.50

Steel Prices

Mill prices as reported to STEEL, Mar. 22, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 205; footnotes, page 207.

SEMIFINISHED

INGOTS, Carbon Forging (NT)

Munhall, Pa. U5 ....$76.00

INGOT, Alloy (NT)

Detroit S41 ....$82.00
Economy, Pa. B14 ....82.00
Farrell, Pa. S3 ....82.00
Lowellville, O. S3 ....82.00
Midland, Pa. C18 ....82.00
Munhall, Pa. U5 ....82.00
Sharon, Pa. S3 ....82.00

BILLETS, BLOOMS & SLABS
Carbon Rerolling (NT)

Bartonville, Ill. K4 ....$82.00
Bessemer, Pa. U5 ....80.00
Buffalo R2 ....80.00
Clairton, Pa. U5 ....80.00
Ensley, Ala. T2 ....80.00
Fairfield, Ala. T2 ....80.00
Fontana, Calif. K1 ....90.50
Gary, Ind. U5 ....80.00
Johnstown, Pa. B2 ....80.00
Lackawanna, N.Y. B2 ..80.00
Munhall, Pa. U5 ....80.00
Owensboro, Ky. G8 ....80.00
S. Chicago, Ill. R2, U5 ..80.00
S. Duquesne, Pa. U5 ....80.00
Sterling, Ill. N15 ....80.00
Youngstown R2 ....80.00

Carbon, Forging (NT)

Bessemer, Pa. U5 ....$99.50
Buffalo R2 ....99.50
Canton, O. R2 ....102.00
Clairton, Pa. U5 ....99.50
Conshohocken, Pa. A3 .104.50
Ensley, Ala. T2 ....99.50
Fairfield, Ala. T2 ....99.50
Farrell, Pa. S3 ....99.50
Fontana, Calif. K1 ....109.00
Gary, Ind. U5 ....99.50
Geneva, Utah C11 ....99.50
Houston S5 ....104.50
Johnstown, Pa. B2 ....99.50
Lackawanna, N.Y. B2 ..99.50
LosAngeles B3 ....109.00
Midland, Pa. C18 ....99.50
Munhall, Pa. U5 ....99.50
Owensboro, Ky. C8 ....99.50
Seattle B3 ....109.00
Sharon, Pa. S3 ....99.50
S. Chicago R2, U5, W14 .99.50
S. Duquesne, Pa. U5 ....99.50
S. SanFrancisco B3 ...109.00
Warren, O. C17 ....99.50

Alloy, Forging (NT)

Bethlehem, Pa. B2 ...$119.00
Bridgeport, Conn. C32 ..119.00
Buffalo R2 ....119.00
Canton, O. R2, T7 ....119.00
Conshohocken, Pa. A3 .126.00
Detroit S41 ....119.00
Economy, Pa. B14 ....119.00
Farrell, Pa. S3 ....119.00
Fontana, Calif. K1 ....140.00
Gary, Ind. U5 ....119.00
Houston S5 ....124.00
Ind. Harbor, Ind. Y1 ..119.00
Johnstown, Pa. B2 ....119.00
Lackawanna, N.Y. B2 ..119.00
LosAngeles B3 ....139.00
Lowellville, O. S3 ....119.00
Massillon, O. R2 ....119.00
Midland, Pa. C18 ....119.00
Munhall, Pa. U5 ....119.00
Owensboro, Ky. G8 ....119.00
Seattle(6) B3 ....140.00
Sharon, Pa. S3 ....119.00
S. Chicago R2, U5, W14 .119.00
S. Duquesne, Pa. U5 ..119.00
Struthers, O. Y1 ....119.00
Warren, O. C17 ....119.00

ROUNDS, SEAMLESS TUBE (NT)

Buffalo R2 ....$122.50
Canton, O. R2 ....125.00
Cleveland R2 ....122.50
Gary, Ind. U5 ....122.50
S. Chicago, Ill. R2, W14 .122.50
S. Duquesne, Pa. U5 ..122.50
Warren, O. C17 ....122.50

SKELP

Aliquippa, Pa. J5 ....5.05
Benwood, W. Va. W10 ...5.05
Ind. Harbor, Ind. Y1 ....5.05
Munhall, Pa. U5 ....5.05
Pittsburgh J5 ....5.05
Warren, O. R2 ....5.05
Youngstown R2, U5 ....5.05

WIRE RODS

Alabama City, Ala. R2 ...6.40
Aliquippa, Pa. J5 ....6.40
Alton, Ill. L1 ....6.60
Bartonville, Ill. K4 ....6.50
Buffalo W12 ....6.40
Cleveland A7 ....6.40
Donora, Pa. A7 ....6.40
Fairfield, Ala. T2 ....6.40
Houston S5 ....6.65
Indiana Harbor, Ind. Y1 .6.40
Johnstown, Pa. B2 ....6.40
Joliet, Ill. A7 ....6.40
Kansas City, Mo. S5 ....6.65
Kokomo, Ind. C16 ....6.50
Los Angeles B3 ....7.20
Minnequa, Colo. C10 ....6.65
Monessen, Pa. P7 ....6.40
Pittsburg, Calif. C11 ....7.20
Portsmouth, O. P12 ....6.40
Roebling, N.J. R5 ....6.50
S. Chicago, Ill. R2, W14..6.40
Sparrows Point, Md. B2 ..6.50
Sterling, Ill. (1) N15 ....6.40
Sterling, Ill. N15 ....6.50
Struthers, O. Y1 ....6.40
Worcester, Mass. A7 ....6.70

STRUCTURALS

Carbon Steel Std. Shapes

Alabama City, Ala. R2 ...5.50
Aliquippa, Pa. J5 ....5.50
Atlanta A11 ....5.70
Bessemer, Ala. T2 ....5.50
Bethlehem, Pa. B2 ....5.55
Birmingham C15 ....5.50
Clairton, Pa. U5 ....5.50
Fairfield, Ala. T2 ....5.50
Fontana, Calif. K1 ....6.30
Gary, Ind. U5 ....5.50
Geneva, Utah C11 ....5.50
Houston S5 ....5.60
Ind. Harbor, Ind. I-2, Y1..5.50
Johnstown, Pa. B2 ....5.55
Joliet, Ill. P22 ....5.50
Kansas City, Mo. S5 ....5.60
Lackawanna, N.Y. B2 ..5.55
LosAngeles B3 ....6.20
Minnequa, Colo. C10 ....5.50
Munhall, Pa. U5 ....5.50
Niles, Calif. P1 ....6.25
Phoenixville, Pa. P4 ....5.55
Portland, Oreg. O4 ....6.25
Seattle B3 ....6.25
S. Chicago, Ill. U5, W14 ..5.50
S. Duquesne, Pa. U5 ....5.50
S. SanFrancisco B3 ....6.15
Sterling, Ill. N15 ....5.50
Struthers, O. Y1 ....5.50
Torrance, Calif. C11 ....6.20
Weirton, W. Va. W6 ....5.50

Wide Flange

Bethlehem, Pa. B2 ....5.55
Clairton, Pa. U5 ....5.50
Fontana, Calif. K1 ....6.45
Indiana Harbor, Ind. I-2..5.50
Lackawanna, N.Y. B2 ..5.55
Munhall, Pa. U5 ....5.50
Phoenixville, Pa. P4 ....5.55
S. Chicago, Ill. U5 ....5.50
Sterling, Ill. N15 ....5.50
Weirton, W. Va. W6 ....5.50

Alloy Std. Shapes

Aliquippa, Pa. J5 ....6.80
Clairton, Pa. U5 ....6.80
Gary, Ind. U5 ....6.80
Houston S5 ....6.90
Munhall, Pa. U5 ....6.80
S. Chicago, Ill. U5, W14..6.80

H.S., L.A., Std. Shapes

Aliquippa, Pa. J5 ....8.05
Bessemer, Ala. T2 ....8.05
Bethlehem, Pa. B2 ....8.10
Clairton, Pa. U5 ....8.05
Fairfield, Ala. T2 ....8.05
Fontana, Calif. K1 ....8.85
Gary, Ind. U5 ....8.05
Geneva, Utah C11 ....8.05
Houston S5 ....8.15
Ind. Harbor, Ind. I-2, Y1 .8.05
Johnstown, Pa. B2 ....8.10
Kansas City, Mo. S5 ....8.15
Lackawanna, N.Y. B2 ..8.10
Los Angeles B3 ....8.75
Munhall, Pa. U5 ....8.05
Phoenixville, Pa. P4 ....8.10
Seattle B3 ....8.80
S. Chicago, Ill. U5, W14..8.05
S. SanFrancisco B3 ....8.70
Sterling, Ill. N15 ....7.75
Struthers, O. Y1 ....8.05

H.S., L.A., Wide Flange

Bethlehem, Pa. B2 ....8.10
Ind. Harbor, Ind. I-2 ....8.05
Lackawanna, N.Y. B2 ..8.10
Munhall, Pa. U5 ....8.05
S. Chicago, Ill. U5 ....8.05
Sterling, Ill. N15 ....7.75

PILING

BEARING PILES

Bethlehem, Pa. B2 ....5.55
Ind. Harbor, Ind. I-2 ....5.50
Lackawanna, N.Y. B2 ..5.55
Munhall, Pa. U5 ....5.50
S. Chicago, Ill. I-2, U5 ..5.50

STEEL SHEET PILING

Ind. Harbor, Ind. I-2 ....6.50
Lackawanna, N. Y. B2 ..6.50
Munhall, Pa. U5 ....6.50
S. Chicago, Ill. I-2, U5 ..6.50
Weirton, W. Va. W6 ....6.50

PLATES

PLATES, Carbon Steel

Alabama City, Ala. R2 ...5.30
Aliquippa, Pa. J5 ....5.30
Ashland, Ky. (15) A10 ...5.30
Atlanta A11 ....5.50
Bessemer, Ala. T2 ....5.30
Clairton, Pa. U5 ....5.30
Claymont, Del. P4 ....5.30
Cleveland J5, R2 ....5.30
Coatesville, Pa. L7 ....5.30
Conshohocken, Pa. A3 ...5.30
Ecorse, Mich. G5 ....5.30
Fairfield, Ala. T2 ....5.30
Farrell, Pa. S3 ....5.30
Fontana, Calif. (30) K1 ..6.10
Gary, Ind. U5 ....5.30
Geneva, Utah C11 ....5.30
Granite City, Ill. G4 ....5.40
Houston S5 ....5.40
Ind. Harbor, Ind. I-2, Y1..5.30
Johnstown, Pa. B2 ....5.30
Lackawanna, N.Y. B2 ..5.30
Mansfield, O. E6 ....5.30
Minnequa, Colo. C10 ....6.15
Munhall, Pa. U5 ....5.30
Newport, Ky. A2 ....5.30
Pittsburgh J5 ....5.30
Riverdale, Ill. A1 ....5.30
Seattle B3 ....6.20
Sharon, Pa. S3 ....5.30
S. Chicago, Ill. U5, W14..5.30
Sparrows Point, Md. B2 ..5.30
Sterling, Ill. N15 ....5.30
Steubenville, O. W10 ....5.30
Warren, O. R2 ....5.30
Youngstown U5, Y1 ....5.30
Youngstown(27) R2 ....5.30

PLATES, Carbon Abras. Resist.

Claymont, Del. P4 ....7.05
Fontana, Calif. K1 ....7.85
Geneva, Utah C11 ....7.05
Houston S5 ....7.15
Johnstown, Pa. B2 ....7.05
Sparrows Point, Md. B2 ..7.05

PLATES, Wrought Iron

Economy, Pa. B14 ....14.10

PLATES, H.S., L.A.

Aliquippa, Pa. J5 ....7.95
Ashland, Ky. A10 ....7.95
Bessemer, Ala. T2 ....7.95
Clairton, Pa. U5 ....7.95
Claymont, Del. P4 ....7.95
Cleveland J5, R2 ....7.95
Coatesville, Pa. L7 ....7.95
Conshohocken, Pa. A3 ...7.95
Economy, Pa. B14 ....7.95
Ecorse, Mich. G5 ....7.95
Fairfield, Ala. T2 ....7.95
Farrell, Pa. S3 ....7.95
Fontana, Calif. (30) K1 ..8.75
Gary, Ind. U5 ....7.95
Geneva, Utah C11 ....7.95
Houston S5 ....8.05
Ind. Harbor, Ind. I-2, Y1..7.95
Johnstown, Pa. B2 ....7.95
Munhall, Pa. U5 ....7.95
Pittsburgh J5 ....7.95
Seattle B3 ....8.85
Sharon, Pa. S3 ....7.95
S. Chicago, Ill. U5, W14..7.95
Sparrows Point, Md. B2 ..7.95
Sterling, Ill. N15 ....7.625
Warren, O. R2 ....7.95
Youngstown U5, Y1 ....7.95

PLATES, Alloy

Aliquippa, Pa. J5 ....7.50
Claymont, Del. P4 ....7.50
Coatesville, Pa. L7 ....7.50
Economy, Pa. B14 ....7.50
Farrell, Pa. S3 ....7.50
Fontana, Calif. K1 ....8.30
Gary, Ind. U5 ....7.50
Houston S5 ....7.60
Ind. Harbor, Ind. Y1 ....7.50
Johnstown, Pa. B2 ....7.50
Lowellville, O. S3 ....7.50
Munhall, Pa. U5 ....7.50
Newport, Ky. A2 ....7.50
Pittsburgh J5 ....7.50
Seattle B3 ....8.40
Sharon, Pa. S3 ....7.50
S. Chicago, Ill. U5, W14..7.50
Sparrows Point, Md. B2 ..7.50
Youngstown Y1 ....7.50

FLOOR PLATES

Cleveland J5 ....6.375
Claymont, Del. P4 ....6.375
Conshohocken, Pa. A3 ...6.375
Ind. Harbor, Ind. I-2 ....6.375
Munhall, Pa. U5 ....6.375
Pittsburgh J5 ....6.375
S. Chicago, Ill. U5 ....6.375

PLATES, Ingot Iron

Ashland c.l. (15) A10 ...5.55
Ashland l.c.l. (15) A10 ..6.05
Cleveland c.l. R2 ....6.05
Warren, O. R2 ....6.05

BARS

BARS, Hot-Rolled Carbon
(Merchant Quality)

Ala. City, Ala. (9) R2 ...5.675
Aliquippa, Pa. (9) J5 ...5.675
Alton, Ill. L1 ....5.875
Atlanta (9) A11 ....5.875
Bessemer, Ala. (9) T2 ..5.675
Birmingham (9) C15 ...5.675
Buffalo (9) R2 ....5.675
Canton, O. (23) R2 ....6.15
Clairton, Pa. (9) U5 ....5.675
Cleveland (9) R2 ....5.675
Ecorse, Mich. (9) G5 ...5.675
Emeryville, Calif. J7 ...6.425
Fairfield, Ala. (9) T2 ...5.675
Fairless, Pa. (9) U5 ....5.825
Fontana, Calif. (9) K1 ..6.375
Gary, Ind. (9) U5 ....5.675
Houston (9) S5 ....5.925
Ind. Harbor (9) I-2, Y1..5.675
Johnstown, Pa. (9) B2 ..5.675
Joliet, Ill. P2 ....5.675
Kansas City, Mo. (9) S5..5.925
Lackawanna (9) B2 ....5.675
Los Angeles (9) B3 ....6.375
Massillon, O. (23) R2 ....6.15
Midland, Pa. (23) C18 ..6.025
Milton, Pa. M18 ....5.825
Minnequa, Colo. C10 ....6.125
Niles, Calif. P1 ....6.375
Owensboro, Ky. (9) G8 ..6.025
Pittsburg, Calif. (9) C11..6.375
Pittsburgh (9) J5 ....5.675
Portland, Oreg. O4 ....6.425
Riverdale, Ill. (9) A1 ...5.675
Seattle (9) A24, B3, N15 ..6.425
S. Ch'c'go (9) R2, U5, W14 5.675
S. Duquesne, Pa. (9) U5..5.675
S. SanFran., Calif. (9) B3 6.425
Sterling, Ill. (1) (9) N15..5.675
Sterling, Ill. (9) N15 ....5.775
Struthers, O. (9) Y1 ....5.675
Tonawanda, N.Y. B12 ..5.675
Torrance, Calif. (9) C11 ..6.375
Warren, O. C17 ....6.025
Youngstown (9) R2, U5..5.675

BARS, Hot-Rolled Alloy

Aliquippa, Pa. J5 ....6.725
Bethlehem, Pa. B2 ....6.725
Bridgeport, Conn. C32 ...6.80
Buffalo R2 ....6.725
Canton, O. R2, T7 ....6.725
Clairton, Pa. U5 ....6.725
Detroit S41 ....6.725
Economy, Pa. B14 ....6.725
Ecorse, Mich. G5 ....6.725
Farrell, Pa. S3 ....6.725
Fontana, Calif. K1 ....7.775
Gary, Ind. U5 ....6.725
Houston S5 ....6.975
Ind. Harbor, Ind. I-2, Y1..6.725
Johnstown, Pa. B2 ....6.725
Kansas City, Mo. S5 ....6.975
Lackawanna, N.Y. B2 ..6.725
Los Angeles B3 ....7.775
Lowellville, O. S3 ....6.725
Massillon, O. R2 ....6.725
Midland, Pa. C18 ....6.725
Owensboro, Ky. G8 ....6.725
Pittsburgh J5 ....6.725
Seattle(6) B3 ....7.825
Sharon, Pa. S3 ....6.725
S. Chicago R2, U5, W14..6.725
S. Duquesne, Pa. U5 ....6.725
Struthers, O. Y1 ....6.725
Warren, O. C17 ....6.725
Youngstown U5 ....6.725

BARS & SMALL SHAPES, H.R.
High-Strength, Low-Alloy

Aliquippa, Pa. J5 ....8.30
Bessemer, Ala. T2 ....8.30
Bethlehem, Pa. B2 ....8.30
Clairton, Pa. U5 ....8.30
Cleveland R2 ....8.30
Ecorse, Mich. G5 ....8.30
Fairfield, Ala. T2 ....8.30
Fontana, Calif. K1 ....9.00
Gary, Ind. U5 ....8.30
Houston S5 ....8.55
Ind. Harbor, Ind. Y1 ....8.30
Johnstown, Pa. B2 ....8.30
Kansas City, Mo. S5 ....8.55
Lackawanna, N.Y. B2 ..8.30
Los Angeles B3 ....9.00
Pittsburgh J5 ....8.30
Seattle B3 ....9.05
S. Chicago, Ill. R2, W14..8.30
S. Duquesne, Pa. U5 ....8.30
S. SanFrancisco B3 ....9.05
Sterling, Ill. N15 ....7.925
Struthers, O. Y1 ....8.30
Youngstown U5 ....8.30

BAR SIZE ANGLES; H.R. Carbon

Bethlehem, Pa. (9) B2 ..5.825
Houston (9) S5 ....5.925
Kansas City, Mo. (9) S5..5.925
Lackawanna (9) B2 ....5.675
Sterling, Ill. N15 ....5.775
Sterling, Ill. (1) N15 ...5.675
Tonawanda, N.Y. B12 ..5.675

BAR SIZE ANGLES; S. SHAPES

Aliquippa, Pa. J5 ....5.675
Atlanta A11 ....5.875
Joliet, Ill. P22 ....5.675
Minnequa, Colo. C10 ....6.125
Niles, Calif. P1 ....6.375
Pittsburgh J5 ....5.675
Portland, Oreg. O4 ....6.425
San Francisco S7 ....6.52
Seattle B3 ....6.425

BAR SIZE ANGLES; S. SHAPES
Wrought Iron

Economy, Pa. B14 ....16.45

BAR SHAPES, Hot-Rolled Alloy

Aliquippa, Pa. J5 ....6.80
Clairton, Pa. U5 ....6.80
Gary, Ind. U5 ....6.80
Houston S5 ....7.05
Kansas City, Mo. S5 ....7.05
Pittsburgh J5 ....6.80
Youngstown U5 ....6.80

BARS, C.F. Loaded
(Including loaded extra)
Carbon

Los Angeles P2, S30 ..11.75*
Alloy

Ambridge, Pa. W18 ...10.175
Beaver Falls, Pa. M12 ..10.175
Camden, N.J. P13 ....10.35
Chicago W18 ....10.175
Elyria, O. W8 ....10.175
Monaca, Pa. S17 ....10.175
Newark, N.J. W18 ....10.35
Spring City, Pa. K3 ....10.35

*Grade A; add 0.5c for Grade B.

BARS, Cold-Finished Carbon

Ambridge, Pa. W18 ....7.65
Beaver Falls, Pa. M12, R2..7.65
Birmingham C15 ....8.25
Buffalo B5 ....7.70
Camden, N.J. P13 ....8.10
Carnegie, Pa. C12 ....7.65
Chicago W18 ....7.65
Cleveland A7, C20 ....7.65
Detroit B5, H5, P17....7.85
Detroit S41 ....7.65
Donora, Pa. A7 ....7.65
Elyria, O. W8 ....7.65
Franklin Park, Ill. N5 ...7.65
Gary, Ind. R2 ....7.65
Green Bay, Wis. F7 ....7.65
Hammond, Ind. J5, L2 ..7.65
Hartford, Conn. R2 ....8.15
Harvey, Ill. B5 ....7.65
Los Angeles(49) S30 ....9.10
Los Angeles(49) P2, R2..9.10
Mansfield, Mass. B5 ....8.20
Massillon, O. R2, R8 ....7.65
Midland, Pa. C18 ....7.65
Monaca, Pa. S17 ....7.65
Newark, N.J. W18 ....8.10
New Castle, Pa. (17) B4 ..7.65
Pittsburgh J5 ....7.65
Plymouth, Mich. P5 ....7.90
Putnam, Conn. W18 ....8.20
Readville, Mass. C14 ....8.20
Seattle(49) S30 ....9.10
S. Chicago, Ill. W14 ....7.65
Spring City, Pa. K3 ....8.10
Struthers, O. Y1 ....7.65
Warren, O. C17 ....7.65
Waukegan, Ill. A7 ....7.65
Willimantic, Conn. J5 ...8.15
Youngstown F3, Y1 ....7.65

BARS, Cold-Finished Alloy
(Turned and Ground)

Cumberland, Md. (5) C19..6.55

BARS, Cold-Finished Alloy

Ambridge, Pa. W18 ....9.025
Beaver Falls, Pa. M12, R2 9.025
Bethlehem, Pa. B2 ....9.025
Bridgeport, Conn. C32 ..9.175
Buffalo B5 ....9.025
Camden, N.J. P13 ....9.20
Canton, O. T7 ....9.025
Carnegie, Pa. C12 ....9.025
Chicago W18 ....9.025
Cleveland A7, C20 ....9.025
Detroit B5, P17 ....9.225
Detroit H5, S41 ....9.025
Donora, Pa. A7 ....9.025
Elyria, O. W8 ....9.025
Franklin Park, Ill. N5 ...9.025
Gary, Ind. R2 ....9.025
Green Bay, Wis. F7 ....9.025
Hammond, Ind. J5, L2..9.025
Hartford, Conn. R2 ....9.325
Harvey, Ill. R5 ....9.025
Lackawanna, N.Y. B3 ..9.025
Los Angeles P2, S30 ...11.00
Mansfield, Mass. B5 ...9.325
Massillon, O. R2, R8 ...9.025
Midland, Pa. C18 ....9.025
Monaca, Pa. S17 ....9.025
Newark, N.J. W18 ....9.20
Plymouth, Mich. P5 ....9.225
S. Chicago, Ill. W14 ....9.025
Spring City, Pa. K3 ....9.20

Struthers,O. Y1 .....9.025
Warren,O. C17 .....9.025
Waukegan, Ill. A7 ....9.025
Willimantic,Conn. J5 ..9.325
Worcester,Mass. A7 ...9.325
Youngstown F3, Y1 ...9.025

BARS, Reinforcing, Billet (To Fabricators)

AlabamaCity,Ala. R2 ..5.675
Atlanta A11 .....5.25
Birmingham C15 .....5.25
Buffalo R2 .....5.675
Cleveland R2 .....5.675
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ..6.425
Fairfield,Ala. T2 .....5.675
Fairless,Pa. U5 .....5.825
Fontana,Calif. K1 ....6.375
Ft.Worth,Tex.(26) T4 ..5.50
Gary,Ind. U5 .....5.675
Houston S5 .....5.675
Ind.Harbor,Ind. I-2, Y1.5.675
Johnstown,Pa. B2 .....5.675
Joliet,Ill. P22 .....5.675
KansasCity,Mo. S5 ....5.675
Kokomo,Ind. C16 ....5.775
Lackawanna,N.Y. B2..5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.875
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 .....6.375
Pittsburg,Calif. C11 ...6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 ....6.425
SandSprings,Okla. S5 ..5.675
Seattle A24, B3, N14 ..6.425
S.Chicago,Ill. R2, W14.5.675
S.Duquesne,Pa. U5 ....5.675
S.SanFrancisco B3 ....6.425
SparrowsPoint,Md. B2..5.675
Steelton,Pa. B2 .....5.675
Sterling,Ill. (1) N15 ..5.675
Sterling,Ill. N15 .....5.775
Struthers,O. Y1 .....5.675
Tonawanda,N.Y. B12 ...6.10
Torrance,Calif. C11 ..6.375
Youngstown R2, U5 ..5.675

BARS, Reinforcing, Billet (Fabricated: to Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Houston S5 .....7.35
Johnstown,Pa. B2 .....7.33
KansasCity,Mo. S5, ...7.35
Lackawanna,N.Y. B2 ..7.35
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 .....7.35
SandSprings,Okla, S5 ...7.35
Seattle A24, B3, N14 ..7.95
SparrowsPoint,Md. B2 ..7.33
St.Paul U8 .....8.17
Williamsport,Pa. S19 ..7.25

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 15.10
Economy,Pa.(D.R.)B14 19.30
Econ.(DirectRolled)B14 13.55
Economy(Staybolt)B14 19.80
McK.Rks.(S.R.) L5 ...14.50
McK.Rks.(D.R) L5 ..19.80
McK.Rks.(Staybolt)L5 .20.95

BARS, Rail Steel

ChicagoHts.(3) C2, I-2.5.575
ChicagoHts.(4) (44) I-2.5.675
ChicagoHts.(4) C2 ....5.675
Franklin,Pa.(3) F5 ....5.575
Franklin,Pa.(4)F5 ....5.675
JerseyShore,Pa.(3) J8 ..5.55
Marion,O.(3) P11 ....5.575
Tonawanda(3) B12 ....5.575
Tonawanda(4) B12 .....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ..5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ....5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit(8) M1 .....5.10
Ecorse,Mich G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill.(8) G4 ..5.20
Ind.Harbor,Ind. I-2, Y1.5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ..5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif. C11 ....5.80
Pittsburgh J5 .....5.10
Portsmouth,O. P12 .....5.10
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14..5.10
SparrowsPoint,Md. B2 ..5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21, S3 .....6.275

SHEETS, H.R. Alloy

Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 ....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....7.525
Ashland,Ky. A10 .....7.525
Cleveland J5, R2 .....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell,Pa. S3 .....7.525
Fontana,Calif. K1 ....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1 7.525
Irvin,Pa. U5 .....7.525
Lackawanna(35) B2 ...7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14.7.525
Sharon,Pa. S3 .....7.525
SparrowsPoint(36) B2..7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 ....7.525
Youngstown U5, Y1 ...7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ...5.35
Cleveland R2 .....5.875
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown,O. A10 ....6.775
Warren,O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 6.275
Aliquippa,Pa. J5 .....6.275
Allenport,Pa. P7 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken,Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W.Va. F4 ..6.275
Fontana,Calif. K1 .....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1 6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2 ..6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 ....6.275
Newport,Ky. A2 .....6.275
Pittsburgh,Calif. C11 ..7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 ....6.275
SparrowsPoint,Md. B2..6.275
Steubenville,O. W10 ...6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 ....10.40
Gary,Ind. U5 .....9.275
Ind.Harbor,Ind. I-2, Y1 9.275
Lackawanna(38) B2 ..9.275
Pittsburgh J5 .....9.275
SparrowsPoint(33) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert	Cu Steel	Cu Fe
Ala.City,Ala. R2	7.225	....
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	7.225	....
Fairfield,Ala. T2	7.225	7.475
Gary,Ind. U5	7.225	7.475
GraniteCity,Ill.G4	7.325	....
Ind.Harbor I-2	7.225	7.475
Irwin,Pa. U5	7.225	7.475
Kokomo,Ind. C16	7.325	....
MartinsFry. W10	7.225	7.475
Pitts.,Calif. C11	7.975	....
Pittsburgh J5	7.225	....
SparowsPt. B2	7.225	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ...7.475

SHEETS, Enameling

Ashland,Ky. A10 .....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 .....6.775
Gary,Ind. U5 .....6.775
Ind.Harbor,Ind. I-2, Y1 6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 .....6.775
SparrowsPoint,Md. B2..6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover,O. E6 .....8.70
Ind.Harbor,Ind. I-2 ....8.70
Mansfield,O. E6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Long Terne, Steel

Follansbee,W.Va. W10 .7.225
Gary,Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 ....7.225
Niles,O. M21, S3 .....7.225
Warren,O. R2 .....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.625

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 9.525
Butler,Pa. A10 (type 2) 9.625
Irvin,Pa. U5 (type 1) ..9.525

SHEETS, Well Casing

Fontana,Calif. K1 ....7.325
Geneva,Utah C11 .....6.80

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....10.125
Pittsburgh J5 .....10.125
SparrowsPt.(39) B2 ..10.025

Sheets, Galvannealed Steel

Canton,O. R2 .....7.275
Irvin,Pa. U5 .....7.275

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....7.125
Middletown,O. A10 ....7.125

SHEETS, Electrogalvanized

Cleveland(28) R2 .....7.65
Niles,O.(28) R2 .....7.65
Weirton,W.Va. W6 ....7.50

SHEETS, Galvanized Steel Hot-Dipped

AlabamaCity,Ala. R2..6.875‡
Ashland,Ky. A10 ....6.875‡
Canton,O. R2 .....6.875‡
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 ....6.875†
Gary,Ind. U5 .....6.875†
GraniteCity,Ill. G4 ....6.975*
Ind.Harbor,Ind. I-2 ..6.875†
Irvin,Pa. U5 .....6.875†
Kokomo,Ind. C16 .....6.975‡
MartinsFerry,O. W10..6.875*
Middletown,O. A10 ..6.875†
Pittsburg,Calif. C11 ...7.625*
Pittsburgh J5 .....6.875†
SparrowsPt.,Md. B2 ..6.875†
Warren,O. R2 .....6.875†
Weirton,Wa.Va. W6 ..6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A24 Alaska Steel Mills Inc.
A25 Algoma Steel Corp. Ltd.

B1 Babcock & Wilcox
B2 Bethlehem Steel Co.
B3 Bethlehem Steel Co., Pacific Coast Div.
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calument Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co., Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N.Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E6 Empire-Reeves Steel
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H5 Hercules Drawn Steel
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.
M23 Mill Strip Products Co. of Pennsylvania

N1 National-Standard Co.
N2 National Supply, Armco Steel Corp.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.
N20 Neville Ferro Alloy Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div., Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Div., Bliss & Laughlin Inc.
S40 Seneca Steel Service
S41 Stainless & Strip Div., J & L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
S44 Screw & Bolt Corp. of America
S45 Somers Brass Co.
S46 Steel Co. of Canada

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope, Armco Steel Corp.
U4 Universal-Cyclops Steel
U5 U. S. Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.

V2 Vanadium-Alloy Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet & Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala. City, Ala. (27) R2 ...5.10
Allenport, Pa. P7 .....5.10
Alton, Ill. L1 .....5.30
Ashland, Ky. (8) A10 ....5.10
Atlanta A11 .....5.10
Bessemer, Ala. T2 .....5.10
Birmingham C15 .....5.10
Conshohocken, Pa. A3 ...5.15
Detroit M1 .....5.10
Ecorse, Mich. G5 .....5.10
Fairfield, Ala. T2 .....5.10
Farrell, Pa. S3 .....5.10
Fontana, Calif. K1 ....5.825
Gary, Ind. U5 .....5.10
Ind. Harbor, Ind. I-2, Y1..5.10
Johnstown, Pa. (25) B2..5.10
Lackaw'na, N.Y. (25) B2.5.10
LosAngeles (25) B3 ....5.85
LosAngeles C1 .....8.60
Minnequa, Colo. C10 ....6.20
Riverdale, Ill. A1 .....5.10
SanFrancisco S7 .....6.60
Seattle (25) B3 .....6.10
Seattle N14 .....6.60
Sharon, Pa. S3 .....5.10
S. Chicago, Ill. W14 ....5.10
S. SanFrancisco (25) B3 ..5.85
SparrowsPoint, Md. B2 ..5.10
Torrance, Calif. C11 ....5.85
Warren, O. R2 .....5.10
Weirton, W.Va. W6 ....5.10
Youngstown U5 .....5.10

STRIP, Hot-Rolled Alloy

Carnegie, Pa. S18 .....8.40
Farrell, Pa. S3 .....8.40
Gary, Ind. U5 .....8.40
Houston S5 .....8.65
Ind. Harbor, Ind. Y1 ....8.40
KansasCity, Mo. S5 ....8.65
LosAngeles B3 .....9.60
Lowellville, O. S3 .....8.40
Newport, Ky. A2 .....8.40
Sharon, Pa. A2, S3 ....8.40
S. Chicago, Ill. W14 ....8.40
Youngstown U5, Y1 ....8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland, Ky. A10 .....7.575
Bessemer, Ala. T2 ....7.575
Conshohocken, Pa. A3 ..7.575
Ecorse, Mich. G5 .....7.575
Fairfield, Ala. T2 .....7.575
Farrell, Pa. S3 .....7.575
Gary, Ind. U5 .....7.575
Ind. Harbor, Ind. I-2, Y1 7.575
Lackawanna, N.Y. B2 ..7.575
LosAngeles (25) B3 ....8.325
Seattle (25) B3 .....8.575
Sharon, Pa. S3 .....7.575
S. Chicago, Ill. W14 ....7.575
S. SanFrancisco (25) B3..8.325
SparrowsPoint, Md. B2 ..7.575
Warren, O. R2 .....7.575
Weirton, W.Va. W6 ....7.575
Youngstown U5, Y1 ...7.575

STRIP, Hot-Rolled Ingot Iron

Ashland, Ky. (8) A10 ....5.35
Warren, O. R2 .....5.875

STRIP, Cold-Rolled Carbon

Anderson, Ind. G6 .....7.425
Baltimore T6 .....7.425
Boston T6 .....7.975
Buffalo S40 .....7.425
Cleveland A7, J5 ...7.425
Dearborn, Mich. S5 ....7.425
Detroit D2, M1, P20 ..7.425
Dover, O. G6 .....7.425
Evanston, Ill. M22 ....7.525
Farrell, Pa. S3 .....7.425
Follansbee, W.Va. W10 ..7.425
Fontana, Calif. K1 ....9.20
FranklinPark, Ill. T6 ..7.525
Ind. Harbor, Ind. Y1 ....7.425
Indianapolis S41 .....7.575
LosAngeles C1, S41 ....9.30
McKeesport, Pa. E10 ...7.525
NewBedford, Mass. R10..7.875
NewBritain, Conn. S15 ..7.875
NewCastle, Pa. B4, M23 7.425
NewHaven, Conn. D2 ...7.875
NewKensington, Pa. A6..7.425
Pawtucket, R.I. R3, N8..7.975
Philadelphia P24 .....7.875
Pittsburgh J5 .....7.425
Riverdale, Ill. A1 .....7.525
Rome, N.Y. (32) R6 ....7.425
Sharon, Pa. S3 .....7.425
Trenton, N.J. (31) R5 ..8.875
Warren, O. R2, T5 ....7.425
Worcester, Mass. A7 ...7.975

STRIP, Cold-Rolled Alloy

Boston T6 .....15.90
Cleveland A7 .....15.55
Carnegie, Pa. S18 .....15.55
Dover, O. G6 .....15.55
Farrell, Pa. S3 .....15.55
FranklinPark, Ill. T6 ..15.55
Harrison, N.J. S18 ....15.55
Indianapolis S41 .....15.70
LosAngeles S41 .....17.75
Lowellville, O. S3 .....15.55
Pawtucket, R.I. S8 ....15.90
Riverdale, Ill. A1 .....15.55
Sharon, Pa. S3 .....15.55
Worcester, Mass. A7 ...15.85
Youngstown S41 .....15.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7 .....10.80
Dearborn, Mich. S3 ....10.80
Dover, O. G6 .....10.80
Farrell, Pa. S3 .....10.80
Ind. Harbor, Ind. Y1 ....10.80
Sharon, Pa. S3 .....10.80
Warren, O. R2 .....10.80
Weirton, W.Va. W6 ....10.80
Youngstown Y1 .....10.80

STRIP, Galvanized (Continuous)

Farrell, Pa. S3 .....7.50
Sharon, Pa. S3 .....7.50

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Anderson, Ind. G6	9.10	....	....	....	....
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. W1	....	10.70	12.90	16.10	19.30
Carnegie, Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn, Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover, O. G6	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. M22	9.05	10.40	12.60	15.60	....
Farrell, Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria, O. S1	10.05	10.40	12.60	15.60	....
FranklinPark, Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison, N.J. C18	....	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain, Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle, Pa. B4, M23	8.95	10.40	12.60	15.60	....
NewHaven, Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington, Pa. A6	8.95	10.40	12.60	15.60	....
NewYork W3	....	10.70	12.90	16.10	19.30
Pawtucket, R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome, N.Y. R6	8.95	10.40	12.60	15.60	18.55
Sharon, Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton, N.J. R5	....	10.70	12.90	15.90	18.85
Warren, O. T5	8.95	10.40	12.60	15.60	18.55
Worcester, Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)			Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol, Conn. W1	....	....	18.85	22.95	27.80
Buffalo W12	....	....	18.85	....	....
Fostoria, O. S1	....	....	19.05	22.15	....
FranklinPark, Ill. T6	....	....	19.20	23.30	28.15
Harrison, N.J. C18	....	....	18.85	22.95	27.80
NewYork W3	....	....	18.85	22.95	27.80
Palmer, Mass. W12	....	....	18.85	....	....
Trenton, N.J. R5	....	....	18.85	22.95	27.80
Worcester, Mass. A7, T6	....	....	18.85	22.95	27.80
Youngstown S41	....	....	19.20	23.30	28.15

STRIP, C.R., Electrogalvanized

Cleveland A7 .....7.425*
Dover, O. G6 .....7.425*
Evanston, Ill. M22 ....7.525*
McKeesport, Pa. E10 ...7.50*
NewCastle, Pa. M23 ..7.425*
Riverdale, Ill. A1 .....7.525*
Warren, O. B9, S3, T5 .7.425*
Worcester, Mass. A7 ....7.975
Youngstown S41, Y1 .7.425*

*Plus galvanizing extras.

STRIP, Cold-Rolled Ingot Iron

Warren, O. R2 .....8.175

TIGHT COOPERAGE HOOP

Atlanta A11 .....5.825
Farrell, Pa. S3 .....5.525
Riverdale, Ill. A1 .....5.675
Sharon, Pa. S3 .....5.525
Youngstown U5 .....5.525

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa, Pa. J5	$9.10	$9.35	$9.75
Fairfield, Ala. T2	*9.10*	*9.35*	*9.75*
Fairless, Pa. U5	*9.10*	*9.35*	*9.75*
Fontana, Calif. K1	9.75	10.00	10.40
Gary, Ind. U5	9.10	9.35	9.75
GraniteCity, Ill. G4	9.20	9.45	9.85
IndianaHarbor, Ind. I-2, Y1	9.10	9.35	9.75
Irvin, Pa. U5	9.10	9.35	9.75
Niles, O. R2	9.10	9.35	9.75
Pittsburg, Calif. C11	9.75	10.00	10.40
SparrowsPoint, Md. B2	9.10	9.35	9.75
Weirton, W.Va. W6	9.10	9.35	9.75
Yorkville, O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET (Dollars per 100 lb)			
Aliquippa, Pa. J5 (21-27 Ga.)	7.90	8.10	....
IndianaHarbor, Ind. Y1 (20-27 Ga.)	7.90	....	....
Niles, O. R2 (20-27 Ga.)	7.90	8.10	8.30

ELECTROLYTIC THIN TIN PLATE (¼ lb coating in coils)

	Base Box 45 lb	50 lb	55 lb	60 lb
Fairfield, Ala. T2	*$6.10*	*$6.25*	*$6.40*	*$6.55*
Fairless, Pa. U5	*6.10*	*6.25*	*6.40*	*6.55*
Gary, Ind. U5	6.10	6.25	6.40	6.55
IndianaHarbor, Ind. I-2	6.10	6.25	6.40	6.55
Irvin, Pa. U5	6.10	6.25	6.40	6.55
SparrowsPoint, Md. B2	6.10	6.25	6.40	6.55
Weirton, W.Va. W6	6.10	6.25	6.40	6.55

TIN PLATE, Hot Dipped 1.25 Common Coke	1.50 lb	1.75 lb
Aliquippa, Pa. J5	$10.40	$10.65
Fairfield, Ala. T2	*10.40*	*10.65*
Fairless, Pa. U5	*10.40*	*10.65*
Fontana, Calif. K1	11.05	11.30
Gary, Ind. U5	10.40	10.65
Irvin, Pa. U5	10.40	10.65
Pitts., Calif. C11	11.05	11.30
Sp. Pt., Md. B2	10.40	10.65
Weirton, W.Va. W6	10.40	10.65
Yorkville, O. W10	10.40	10.65

BLACK PLATE (Base Box)	
Aliquippa, Pa. J5	$8.20
Fairfield, Ala. T2	*8.20*
Fairless, Pa. U5	*8.20*
Fontana, Calif. K1	8.85
Gary, Ind. U5	7.85
GraniteCity, Ill. G4	7.95
Ind. Harbor, Ind. Y1	7.85
Irvin, Pa. U5	7.85
Yorkville, O. W10	7.85

HOLLOWARE ENAMELING (Black Plate) (29 Gage)

Aliquippa, Pa. J5 .....7.85
Gary, Ind. U5 .....7.85
GraniteCity, Ill. G4 .....7.95
Ind. Harbor, Ind. Y1 ....7.85
Irvin, Pa. U5 .....7.85
Yorkville, O. W10 .....7.85

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom, W.Va. W10	....	11.70	12.40	13.35	14.65
Brackenridge, Pa. A4	....	....	12.40	13.55	14.65
GraniteCity, Ill. G4	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor, Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield, O. E6	9.875*	11.70	12.40	13.55	14.65
Newport, Ky. A2	9.875	11.70*	12.40*	13.55*	14.65*
Niles, O. M21	9.875*	11.70	12.40	13.55	....
Vandergrift, Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren, O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville, O. A10	....	11.70†	12.40	13.55	14.65

	Stator
Mansfield, O. E6	8.10
Vandergrift, Pa. U5	8.10
Warren, O. R2 (Locore)	8.10

SHEETS (22 Ga., coils & cut lengths)

Fully Processed (Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
BeechBottom, W.Va. W10	15.70	16.30	16.80	17.85
Zanesville, O. A10	15.70	16.30	16.80	17.85
Vandergrift, Pa. U5	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge, Pa. A4	....	18.10	19.70	20.20	20.70	15.70††
Butler, Pa. A10	....	....	19.70	20.20	20.70	....
Vandergrift, Pa. U5	17.10	18.10	19.70	20.20	20.70	15.70
Warren, O. R2	....	....	....	....	....	15.70‡

*Semiprocessed. †Fully processed only. ‡Coil annealed; semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity, Ala. R2 ..8.00
Aliquippa, Pa. J5 .....8.00
Alton, Ill. L1 .....8.20
Atlanta A1 .....8.00
Bartonville, Ill. K4 .....8.10
Buffalo W12 .....8.00
Chicago W13 .....8.00
Cleveland A7, C20 .....8.00
Crawfordsville, Ind. M8..8.10
Donora, Pa. A7 .....8.00
Duluth A7 .....8.00
Fairfield, Ala. T2 .....8.00
Fostoria, O. (24) S1 .....8.10
Houston S5 .....8.25
Jacksonville, Fla. M8 ...8.35
Johnstown, Pa. B2 .....8.00
Joliet, Ill. A7 .....8.00
KansasCity, Mo. S5 ....8.25
Kokomo, Ind. C16 .....8.10
LosAngeles B3 .....8.95
Minnequa, Colo. C10 ....8.25
Monessen, Pa. P7, P16..8.00
Palmer, Mass. W12 ....8.30
Pittsburg, Calif. C11 ....8.95
Portsmouth, O. P12 ....8.00
S. Chicago, Ill. R2 .....8.00
S. SanFrancisco C10 ....8.95
SparrowsPoint, Md. B2..8.10
Sterling, Ill. (1) N15 ....8.00
Sterling, Ill. N15 .....8.10
Struthers, O. Y1 .....8.00
Waukegan, Ill. A7 .....8.00
Worcester, Mass. A7 ....8.30

WIRE, Cold Heading Carbon

Elyria, O. W8 .....8.00

WIRE, Gal'd., for ACSR

Bartonville, Ill. K4 ....12.65
Buffalo W12 .....13.40
Cleveland A7 .....12.65
Donora, Pa. A7 .....12.65
Duluth A7 .....12.65
Johnstown, Pa. (10) B2..12.65
KansasCity, Mo. U3 ...12.90
LosAngeles (2) B3 ....13.60
Minnequa, Colo. C10 ..12.775
Monessen, Pa. P7, P16..12.65
Muncie, Ind. I-7 .....13.60
NewHaven, Conn. A7 ..12.95
Palmer, Mass. W12 ....13.70
Pittsburg, Calif. C11 ..13.45
Portsmouth, O. P12 ....12.65
Roebling, N.J. R5 ....12.95
SparrowsPt., Md. (10) B2 12.75
Struthers, O. Y1 .....13.40
Trenton, N.J. A7 .....12.95
Waukegan, Ill. A7 .....12.65
Worcester, Mass. A7 ....12.95

WIRE, Upholstery Spring

Aliquippa, Pa. J5 .....9.75
Alton, Ill. L1 .....9.95
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora, Pa. A7 .....9.75
Duluth A7 .....9.75
Johnstown, Pa. B2 .....9.75
KansasCity, Mo. S5, U3..10.00
Kokomo, Ind. C16 .....9.85
LosAngeles B3 .....10.70
Minnequa, Colo. C10 ....9.95
Monessen, Pa. P7, P16 ..9.75
NewHaven, Conn. A7 ...10.05
Palmer, Mass. W12 ....10.05
Pittsburg, Calif. C11 ..10.075
Portsmouth, O. P12 ....9.75
Roebling, N.J. R5 ....10.05
S. Chicago, Ill. R2 .....9.75
S. SanFrancisco C10 ....10.70
SparrowsPt., Md. B2 ....9.85
Struthers, O. Y1 .....9.75
Trenton, N.J. A7 .....10.05
Waukegan, Ill. A7 .....9.75
Worcester, Mass. A7 ....10.05

WIRE, MB Spring, High-Carbon

Aliquippa, Pa. J5 .....9.75
Alton, Ill. L1 .....9.95
Bartonville, Ill. K4 ....9.85
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora, Pa. A7 .....9.75
Duluth A7 .....9.75
Fostoria, O. S1 .....9.80
Johnstown, Pa. B2 .....9.75
KansasCity, Mo. S5, U3..10.00
LosAngeles B3 .....10.70
Milbury, Mass. (12) N6 .10.05
Minnequa, Colo. C10 ....9.95
Monessen, Pa. P7, P16 ..9.75
Muncie, Ind. I-7 .....9.95
Palmer, Mass. W12 ....10.05
Pittsburg, Calif. C11 ...10.70
Portsmouth, O. P12 ....9.75
Roebling, N.J. R5 ....10.05
S. Chicago, Ill. R2 .....9.75
S. SanFrancisco C10 ...10.70
SparrowsPt., Md. B2 ....9.85
Struthers, O. Y1 .....9.75
Trenton, N.J. A7 .....10.05
Waukegan, Ill. A7 .....9.75
Wor'ster, Mass. A7, J4, T6 10.05

WIRE, Fine & Weaving (8" Coils)

Alton, Ill. L1 .....16.50
Bartonville, Ill. K4 ....16.40
Chicago W13 .....16.30
Cleveland A7 .....16.30
Crawfordsville, Ind. M8..16.40
Fostoria, O. S1 .....16.30
Houston S5 .....16.55
Jacksonville, Fla. M8 ...16.65
Johnstown, Pa. B2 .....16.30
KansasCity, Mo. S5 ....16.55
Kokomo, Ind. C16 .....16.30
Minnequa, Colo. C16 ....16.55
Monessen, Pa. P16 .....16.30
Muncie, Ind. 1-7 .....16.50
Palmer, Mass. W12 ....16.60
S. SanFrancisco C10 ...17.15
Waukegan, Ill. A7 .....16.30
Worcester, Mass. A7, J6..16.60

ROPE WIRE (A)

Bartonville, Ill. K4 ....13.45
Buffalo W12 .....13.45
Fostoria, O. S1 .....13.45
Johnstown, Pa. B2 .....13.45
Monessen, Pa. P7 .....13.45
Muncie, Ind. I-7 .....13.65
Palmer, Mass. W12 ....13.75
Portsmouth, O. P12 ....13.45
Roebling, N.J. R5 .....13.75
St. Louis L8 .....13.45
SparrowsPt., Md. B2 ...13.55
Struthers, O. Y1 .....13.45
Worcester, Mass. J4 ...13.75

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE, Tire Bead

Bartonville,Ill. K4	17.15
Monessen,Pa. P16	17.15
Roebling,N.J. R5	17.65

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville,Ind. M8	12.35
Dover,O. G6	12.35
Evanston,Ill. M22	12.45
Farrell,Pa. S3	12.35
Fostoria,O. S1	12.35
FranklinPark,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O. R8	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
NewCastle,Pa. M23	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N8	12.65
Philadelphia P24	12.65
Riverdale,Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N.J. R5	12.65
Warren,O. B9	12.35
Worcester,Mass. A7, T6	12.65

NAILS, Stock Sizes

	Col.
AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers: per cwt)

Galveston,Tex. D7	$10.30

NAILS, CUT (100 lb kegs)

Wheeling,W.Va. W10	$10.10

POLISHED STAPLES

	Col.
AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	178
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

TIE WIRE, Automatic Baler
(14½ Ga.) (per 97 lb Net Box)
Coil No. 3150

AlabamaCity,Ala. R2	$8.78
Atlanta A11	10.36
Bartonville,Ill. K4	8.88
Buffalo W12	10.26
Chicago W13	9.24
Crawfordsville,Ind. M8	8.88
Donora,Pa. A7	8.78
Duluth A7	8.78
Fairfield,Ala. T2	8.78
Houston S5	10.51
Jacksonville,Fla. M8	8.88
Johnstown,Pa. B2	8.78
Joliet,Ill. A7	8.78
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	8.88
LosAngeles B3	9.44
Minnequa,Colo. C10	9.02
Pittsburg,Calif. C11	9.44
S.Chicago,Ill. R2	8.78
S.SanFrancisco C10	9.94
SparrowsPt.,Md. B2	8.88
Sterling,Ill.(37) N15	8.88

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$9.06
Atlanta A11	10.70
Bartonville,Ill. K4	9.16
Buffalo W12	10.60
Chicago W13	9.54
Crawfordsville,Ind. M8	9.16
Donora,Pa. A7	9.06
Duluth A7	9.06
Fairfield,Ala. T2	9.06
Houston S5	10.85
Jacksonville,Fla. M8	9.16
Johnstown,Pa. B2	9.06
Joliet,Ill. A7	9.06
KansasCity,Mo. S5	10.85
Kokomo,Ind. C16	9.16
LosAngeles B3	9.75
Minnequa,Colo. C10	9.30
Pittsburg,Calif. C11	9.75
S.Chicago,Ill. R2	9.06
S.SanFrancisco C10	10.26
SparrowsPt.,Md. B2	9.16
Sterling,Ill.(37) N15	9.16

Coil No. 6500 Interim

AlabamaCity,Ala. R2	$9.11
Atlanta A11	10.75
Bartonville,Ill. K4	9.21
Buffalo W12	10.65
Chicago W13	9.59
Crawfordsville,Ind. M8	9.21
Donora,Pa. A7	9.11
Duluth A7	9.11
Fairfield,Ala. T2	9.11
Houston S5	10.90
Jacksonville,Fla. M8	9.21
Johnstown,Pa. B2	9.11
Joliet,Ill. A7	9.11
KansasCity,Mo. S5	10.96
Kokomo,Ind. C16	9.21
LosAngeles B3	9.80
Minnequa,Colo. C10	9.35
Pittsburg,Calif. C11	9.80
S.Chicago,Ill. R2	9.11
S.SanFrancisco C10	10.31
SparrowsPt.,Md. B2	9.21
Sterling,Ill.(37) N15	9.21

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	212
Atlanta A11	212
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

FENCE POSTS

	Col.
Birmingham C15	177
ChicagoHts.,Ill. C2, I-2	177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	177

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	193**
Aliquippa,Pa. J5	190§
Atlanta A11	197*
Bartonville,Ill. K4	199
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	196§
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196§
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193**
SparrowsPoint,Md. B2	198§
Sterling,Ill.(7) N15	198

WIRE (16 gage)	An'ld Galv. Stone	Galv. Stone
Ala.City,Ala.R2	17.85	19.40**
Ali'ppa,Pa. J5	17.85	19.65
Bartonville K4	17.95	19.80
Chicago W13	17.85	----
Cleveland A7	17.85	----
Craw'sville M8	17.95	19.80††
Fostoria,O. S1	18.35	19.90†
Houston S5	18.10	19.65**
Jacksonville M8	18.95	19.80††
Johnstown B2	17.85	19.65§
Kan.City,Mo. S5	18.10	----
Kokomo C16	17.95	19.50†
Minnequa C10	18.10	19.65**
P'lm'r,Mass.W12	18.15	19.70†
Pitts.,Calif. C11	18.20	19.75†
S.SanFran. C10	18.20	19.75**
SparrowsPt. B2	17.95	19.75§
St'ling(37) N15	17.95	19.80
Waukegan A7	17.85	19.40†
Worcester A7	18.15	----

WOVEN FENCE, 9-15 Ga. Col.

Ala.City,Ala. R2	187**
Aliq'ppa,Pa.9-11½ga.J5	190§
Atlanta A11	191*
Bartonville,Ill. K4	193
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. M8	192
Johnstown,Pa.(42) B2	190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A1	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192

WIRE, Merchant Quality

(6 to 8 gage)	An'ld Galv.
Ala.City,Ala. R2	9.00 9.55**
Aliquippa J5	8.65 9.325§
Atlanta (48) A11	9.00 9.75*
Bartonville(48)K4	9.85 19.90
Buffalo W12	9.00 9.55†
Chicago W13	9.00 9.55**
Cleveland A7	9.00 ----
Crawfordsville M8	9.10 9.80††
Donora,Pa. A7	9.00 9.55†
Duluth A7	9.00 9.55†
Fairfield T2	9.00 9.55†
Houston(48) S5	9.25 9.80**
Jack'ville,Fla. M8	9.10 9.80†‡
Johnstown(48) B2	9.00 9.675§
Joliet,Ill. A7	9.00 9.55†
KansasCity(48)S5	9.25 9.80**
Kokomo(48) S16	9.10 9.65†
LosAngeles B3	9.95 10.625§
Minnequa C10	9.25 9.80**
Monessen(48) P7	8.65 9.35§
Palmer,Mass. W12	9.30 9.85†
Pitts.,Calif. C11	9.95 10.50†
Rankin,Pa. A7	9.00 9.55†
S.Chicago R2	9.00 9.55**
S.SanFran. C10	9.95 10.50**
Spar'wsPt.(48)B2	9.10 9.775§
St'ling(37)(48)N15	9.10 9.80
Struthers,O. Y1	9.00 9.65†
Worcester,Mass.A7	9.30 9.85†

Based on zinc prices of: *13.50c. †5c. §10c. ‡Less than 10c. ††10.50c. ‡‡11.00c. **Subject to zinc equalization extras.

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½ in., larger 12.85
7/16 in. and smaller by 6 in. and shorter: 15% off list.

FASTENERS

(Consumer discounts per cent off list prices, orders for 1 container for assorted sizes; for less than container quantities, add 25 per cent; attaching nuts to bolts, package sizes, add 7.5 per cent; heavy hex nuts 1¼ in. through 1½ in. tapped 8 threads, add 10 per cent)

HEX HEAD CAP SCREWS, coarse, or fine thread, packaged or bulk, with or without hex nuts, 1020 steel bright and high carbon heat treated, ¼ in. thru 1 in. diam., listed lengths:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	39.25
Bulk	46

BOLTS, Standard stock sizes:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	39.25
*Bulk	46

*Hot galvanized or zinc plated lag bolts only — for package or bulk quantities use applicable list less bulk discounts.

CAP AND SETSCREWS,

Fillister Head, Cap Screws, Coarse Thread:

Packaged	+55
Bulk	+16

Flat Head Cap Screws:

¾ in. and smaller, 6 in. and shorter:	
Packaged	+85
Bulk	+38

Setscrews, Square Head, Cup Point, Coarse Thread:

Through 1 in. diam., 6 in. and shorter:	
Packaged	+ 5
Bulk	19
Through 1 in. diam., longer than 6 in.:	
Packaged	+29

HEXAGON NUTS: American Standard: Finished hex, hex jam, and hex slotted coarse or fine fine thread, ¼ in. through 3 in., finished hex thick, thick and slotted, castle, fine thread, ¼ in. through 1½ in., semifinished hex heavy, heavy and jam, heavy and slotted, coarse thread, ¼ in. through 4 in., and

SQUARE NUTS, American Standard: Regular square and heavy square, coarse thread, ¼ in. through 2 in.:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	39.25
Bulk	46

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over)

	Standard Diameter, Inches				
	1/4	5/16	3/8	7/16	1/2
Buffalo W12	$26.20	$38.50	$47.90	$61.30	$80.30
KansasCity,Mo. U3	26.20	38.50	47.90	61.30	80.30
Minnequa,Colo. C10	26.20	38.50	47.90	61.30	80.30
Pittsburg,Calif. C11	26.20	38.50	47.90	61.30	80.30
Roebling,N.J. R5	26.20	38.50	47.90	61.30	80.30
SparrowsPoint,Md. B2	26.20	38.50	47.90	61.30	80.30
St. Louis L8	26.20	38.50	47.90	61.30	80.30
Waukegan,Ill. A7	26.20	38.50	47.90	61.30	80.30

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut length 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	27.24	23.13
1¼	13	....	32.25	24.41
1½	13	30.42	35.65	28.96
1¾	13	35.94	42.12	31.89
2	13	40.28	47.21	35.74
2¼	13	45.36	58.17	40.26
2¼	12	49.24	57.72	43.70
2½	12	54.23	63.57	48.13
2¾	12	58.73	68.83	52.13
3	12	62.62	73.40	55.59

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	All No. 2	Toe Rails 60 lb Under
Bessemer,Pa. U5	5.75	5.65	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....(16)	6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.225
Steelton,Pa. B2	5.75	5.65	....	....
Williamsport,Pa. S19	....	....	....	6.725

TIE PLATES

Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa,Colo. C10	6.875
Seattle B3	7.025
Steelton,Pa. B2	6.875
Torrance,Calif. C11	7.025

JOINT BARS

Bessemer,Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N.Y. B2	7.25
Minnequa,Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES

Ind.Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

SCREW SPIKES

Lebanon,Pa. B2	15.10

TRACK BOLTS, Untreated

Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon,Pa. B2	15.35
Minnequa,Colo. C10	15.35
Pittsburgh S44	15.35
Seattle B3	15.85

STANDARD TRACK SPIKES

Fairfield,Ala. T2	10.10
Ind.Harbor,Ind. I-2, Y1	10.10
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

Footnotes

(1) Chicago base.
(2) Double galvanized.
(3) Merchant.
(4) Reinforcing.
(5) 1¼ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in.; 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Limited analyses only.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Bethany A coating.
(12) Worcester, Mass., base.
(15) 3/8" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Deld. in mill zone, 5.65c.
(27) Bar mill sizes.
(28) Bonderized.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over 5/8 in.; 7.375c, for widths 5/8 in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) 14 Ga., 48 in.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds and 2½ in. and smaller hexagons; 9.65c for larger rounds and hexagons and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Youngstown Y1	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Alton, Ill. L1	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Benwood, W. Va. W10	1.5	+27	+10.5	+36	+21	+45.5	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Butler, Pa. F6	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+28	+7.75	+24	+4.25	+19.5	+1.75	+18.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+16	4.25	+12	7.75	+7.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sharon, Pa. S4	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sparrows Pt., Md. B2	2.5	+26	+10.5	+36	+21.5	+46	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Wheatland, Pa. W9	4.5	+24	+8.5	+34	+19.5	+44	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.75		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Alton, Ill. L1	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Benwood, W. Va. W10	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Etna, Pa. N2	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Fairless, Pa. N3	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Fontana, Calif. K1	+1.25	+17.25	+0.75	+16.75	0.75	+16.5	0.75	+16.5	+9.75	+27.5	+9.75	+27.5
Indiana Harbor, Ind. Y1	10.75	+5.25	11.25	+4.75	12.75	+4.5	12.75	+4.5	2.25	+15.5	2.25	+15.5
Lorain, O. N3	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Sparrows Pt., Md. B2	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Wheatland, Pa. W9	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Youngstown R2, Y1	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5

*Galvanized pipe discounts based on price of zinc at 11.50c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25.00	....	36.00	....	43.50	39.25	48.50	45.00
202	24.75	28.25	37.75	39 00	42.25	44.50	40.00	49.25	49.25
301	24.00	26.00	38.75	37.25	43.50	46.00	41.25	51.25	47.50
302	26.25	29 50	39.50	40.50	44.25	46.75	42.25	52.00	52.00
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	29.50	39.50	40.50	44.25	46.75	45.75	52.00	52.00
304L	....	37.25	47.25	48.25	52.00	54.50	53.50	59.75	59.75
305	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71.75	75.75	71.75	80.75	80.75
316L	....	55.25	72.25	76.25	79.50	83.50	79.50	88.50	88.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.50	65.50
330	....	....	123.25	....	98.75	143.75	135.00	149.25	149.25
18-8 CbTa	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	79.25
403	....	....	29.25	....	33.25	35.00	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	29.25	31.00	33.25	35.00	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	40.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	51.75
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Somers Brass Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steel Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	Plates 5%	Plates Carbon Base 10%	Plates Carbon Base 15%	Plates Carbon Base 20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	49.80	61.35	72.80	84.40	....
Nickel	43.20	55.05	66.95	78.90	....
Nickel, Low Carbon	43.50	55.70	67.95	80.35	....
Monel	44.25	55.35	66.45	77.60	....

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	36.10	43.00

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. P4; Coatesville, Pa. L7; New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	Hi-Carbon-Cr (D-11)	0.955
Spec. Carbon (W-1)	0.385	V-Cr Hot Work (H-13)	0.550
Oil Hardening (O-1)	0.505	W-Cr Hot Work (H-12)	0.530
V-Cr Hot Work (H-11)	0.505	W Hot Wk (H-21)	1.425-1.44

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	....	T-1	1.840
18	4	2	....	....	T-2	2.005
13.5	4	3	....	....	T-3	2.105
18.25	4.25	1	4.75	....	T-4	2.545
18	4	2	9	....	T-5	2.915
20.25	4.25	1.6	12.95	....	T-6	4.330
13.75	3.75	2	5	....	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

Prices in dollars per gross ton, f.o.b. (rail) furnace; add 50 cents when shipped by truck. Maximum delivered prices are approximate and based on rail shipment.

Birmingham District	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham R2	62.00	62.50**	66.50	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N. Tonawanda, N.Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester, N.Y., deld.	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S. Chicago R2	66.00	66.50	66.50	67.00
S. Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	68.81	69.31	69.31	69.81
Muskegon, Mich., deld.	....	74.46	74.46	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron, Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P	Nom.	Nom.	Nom.	....
Swedeland, Pa. A3	68.00	68.50	69.00	69.50
New York, deld.	....	75.41	75.91	....
Newark, N.J., deld.	72.53	73.03	73.53	74.03
Philadelphia, deld.	70.18	70.68	71.18	71.68
Troy, N.Y., R2	68.00	68.50	69.00	69.50
Boston, deld.	75.20	75.70	76.20	76.70
Pittsburgh District				
Neville Island, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), deld.	....	68.31	68.31	68.81
Monaca, Pa., deld.	....	68.33	68.33	68.83
Lawrenceville, W. Homestead, Wilmerding, Pa., deld.	....	68.68	68.68	69.18
Verona, Trafford, Pa., deld.	68.83	69.33	69.33	69.83
Brackenridge, Pa., deld.	69.16	69.66	69.66	70.16
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....

Other U. S. Districts	Basic	No. 2 Foundry	Malle-able	Besse-mer
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
Granite City, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	68.00	68.50	69.00	....
Rockwood, Tenn. T3	62.00	62.50‡	66.50	67.00
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....
Mansfield, Ohio, deld.	....	....	71.34	....
Canadian District				
Hamilton, Ont. S46	65.00	65.00	65.50	....
Port Colborne, Ont. A25	65.00	65.00	65.50	66.00
Sault Ste. Marie, Ont. A25	65.00	65.00	65.50	66.00

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 13%; starting with silicon over 13% add $1 per ton for each 0.50% silicon or portion thereof up to 14%; over 14%, price is $93 with $1 differential; add $1 for each 0.50% Mn over 1%)

Buffalo H1	$79.25
Jackson, Ohio I-3, J1	78.00
Port Colborne, Ont. A25	78.50
Toledo, Ohio I-3	78.00

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.50% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Calvert City, Ky. I-15	$99.00
Niagara Falls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry. K2	89.00
Keokuk, Iowa O.H. & Fdry. 12¼ lb piglets, 16% Si, K2	92.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Birdsboro, Pa. B10 (Phos. 0.075% max)	$73.00
Lyles, Tenn. T3 (Phos. 0.035% max)	73.00
Rockwood, Tenn. T3 (Phos. 0.035% max)	73.00
Buffalo H1 (Intermediate) (0.036-0.075% max)	71.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Neville Island, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Swedeland, Pa A3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Troy, N.Y. R2 (Phos. 0.075% max)	73.00

Steel Service Center Products

Representative prices, cents per pound, f.o.b. warehouse, for 2000 lb items (except stainless) ordered by themselves. Prices will vary with total weight of the order or weight of the individual items or both. Base quantities for stainless sheets: 8000 lb, except in Chicago, New York, Boston, Los Angeles, and San Francisco, 10,000 lb. City delivery charges are 15 cents per 100 lb except: Denver, 20 cents; Baltimore, Boston, New York, Philadelphia, San Francisco, 10 cents; Atlanta, Birmingham, Dallas, Houston, Los Angeles, Seattle, no charge.

	SHEETS				STRIP	BARS			STRUCTURAL	PLATES	
	Hot Rolled	Cold Rolled	Galv.	Stainless Type 302	Hot Rolled	H.R. Rounds	C.F. Rounds	H.R Alloy 4140	SHAPES	Carbon	Floor
Atlanta	9.37	10.61	11.83	....	10.85	9.53	13.24	....	9.94	9.73	11.16
Baltimore	9.20	9.61	10.06	....	11.25	9.65	11.70	16.38	9.85	9.60	11.10
Birmingham	8.46	10.20	10.59	....	10.41	8.26	13.14	16.65	8.47	8.41	10.05
Boston	9.74	10.58	11.77	53.50	12.16	9.77	13.35	16.69	10.16	9.62	11.08
Buffalo	8.55	9.30	11.25	55.98	11.00	8.75	11.45	16.30	9.15	8.65	11.10
Charlotte, N. C.	10.52	11.22	10.55	....	11.51	10.32	12.68	....	10.53	10.47	12.11
Chicago	9.22	10.20	10.70	52.00	11.39	9.22	10.65	15.95	9.57	9.06	11.35
Cincinnati	9.34	10.26	10.75	65.30	11.71	9.33	11.53	16.27	10.14	9.44	11.68
Cleveland	9.22	10.66	10.92	56.18	11.51	9.33	11.25	16.06	9.96	9.30	11.59
Dallas	10.57	10.05	11.75	....	12.13	9.98	12.98	16.95	10.21	9.81	11.18
Detroit	9.48	10.46	11.05	52.00	11.76	9.53	11.01	16.23	10.14	9.43	11.61
Denver	9.41	11.77	12.11	....	9.86	10.10	11.47	....	10.02	9.69	11.53
Houston	10.17	9.65	11.35	52.00	11.73	9.58	13.10	16.55	9.81	9.41	10.78
Indianapolis	9.66	10.64	11.14	....	11.83	9.66	11.09	16.39	10.01	9.50	11.79
Kansas City	9.21	10.87	11.35	....	10.87	9.31	11.57	15.72	9.80	9.10	....
Los Angeles	10.35	11.20	12.10	61.27	12.40	10.25	14.20	17.35	10.45	10.30	12.30
Memphis, Tenn.	9.63	10.35	10.80	....	11.29	9.48	12.70	16.53	9.67	9.32	11.18
Milwaukee	9.36	10.34	10.84	....	11.53	9.36	10.89	16.09	9.79	9.20	11.49
Moline, Ill.	9.62	10.60	11.10	....	11.79	9.62	11.05	16.40	9.97	9.46	11.75
Newark, N. J.	9.36	10.13	11.35	....	11.46	9.74	13.25	16.40	10.20	9.51	11.05
New York	9.36	10.13	11.35	52.98	11.46	9.74	13.25	16.40	10.20	9.51	11.00
Philadelphia	9.80	9.60	10.66	52.71	11.25	9.65	11.95	16.38	9.85	9.60	11.10
Pittsburgh	9.22	10.53	11.58	52.00	11.49	9.22	11.25	16.95	8.91	9.06	11.35
Portland, Oreg.	10.40	12.25	12.35	....	12.40	10.40	16.65	17.85	11.00	10.55	12.70
St. Louis	9.42	10.58	11.08	....	11.59	9.44	11.28	16.33	9.80	9.28	11.59
St. Paul	9.57	10.24	11.39	....	11.74	9.57	11.49	16.54	9.92	9.41	11.70
San Francisco	10.17	11.69	11.40	54.00	11.78	10.07	15.10	18.20	10.49	10.38	12.47
Seattle	11.35	12.45	13.40	54.02	12.80	10.80	10.20	17.80	11.59	10.95	13.60
Spokane, Wash.	11.20	12.30	13.25	54.02	12.65	10.65	16.20	17.85	11.35	10.80	13.01

Specifications: Hot rolled sheet, sheared edge, 10 Ga. & 36 x 96-120 in.; cold rolled sheets, 20 Ga. & 36 x 96-120 in.; galvanized sheets, 10 Ga. x 36 x 120 in. except Los Angeles, Dallas and Houston, 10 Ga. x 48 x 120 in.; stainless, 16 Ga. & 36 in.; hot rolled strip, ¼ in. x 1 in.; hot rolled carbon bars, rounds, ¾ in.—1¼ in., M1020; cold finished bars, 1 in., C1018; hot rolled alloy bars, 4140 annealed, 1⅝ in.—2⅞ in. rounds; structural shapes, I beams, 6 x 12½ in.; carbon plates, sheared, through ½ in. x 84 in.; floor plates, ¼ in. x 36 in.

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., $140; Salina, Pa., $145; Niles, Ohio, $146; Cutler, Utah, $175.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Md., St. Louis, $185; Stevens Pottery, Ga., $195; Cutler, Utah, $248.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., St. Louis, $158; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $163; E. Chicago, Ind., Joliet, Rockdale, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $158; Morrisville, Hays, Latrobe, Pa., $163; E. Chicago, Ind., St. Louis, $168; Canon City, Colo., $183; Curtner, Calif., $185.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $140; Philadelphia, Clearfield, Pa., $145.

Ladle Brick (per 1000 pieces*)

Dry-Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Vandalia, Mo., New Salisbury, Ohio, $97; Vanport, Pa., Wellsville, Irondale, Ohio, $100; Clearfield, Pa., Portsmouth, Ohio, $102; St. Louis, Mexico, Mo., $120.

High-Alumina Brick (per 1000 pieces*)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Danville, Ill., $250; Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., $260.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., $320; Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., $360; Philadelphia, $365.

Sleeves (per 1000)

St. Louis, $193; Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Clearfield, Pa. $234.

Dolomite (per net ton)

Domestic, dead-burned bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.00.

Magnesite (per net ton)

Domestic, dead-burned, ½ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅜ in. grains with fines: Baltimore (periclase), $73; Pascagoula, Miss. (periclase), $90.

*—9 in. x 4½ x 2.50 straights.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Inches Diam	Length	Per 100 lb
2	24	$64.00
2½	30	41.50
3	40	39.25
4	40	37.00
5½	40	36.50
6	60	33.25
7	60	29.75
8, 9, 10	60	29.50
12	72	28.25
14	60	28.25
16	72	27.25
17	60	27.25
18	72	27.00
20	72	26.50
24	84	27.25

CARBON

8	60	14.25
10	60	13.80
12	60	14.75
14	60	14.75
14	72	12.55
17	60	12.65
17	72	12.10
20	90	11.55
24	72, 84	11.95
24	96	12.10
30	84	12.00
35, 40	110	11.60
40	100	12.50

Canadian Steel

(Cents per lb, f.o.b. mill, except as otherwise noted)

Billets, Blooms & Slabs:

Carbon (N.T.):
Forging $97.00
Rerolling 78.00
Alloy (N.T.) 115.00

Wire Rods:
Carbon 5.70
Alloy 6.40

Wire (carload lots):
Merchant annealed . 8.40
Low carbon indus. . 7.20
Upholstery spring .. 8.55
M.B. spring 8.85

Bars & Small Shapes:
Carbon, merchant .. 5.30
Carbon, special 5.85
Alloy 6.40

Bar Mill Bands:
Carbon 5.40
Alloy 8.05

Bars, Reinforcing 5.30

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, efective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60% $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid, $28-$28.50; barge, Brownsville, Tex., $30-$31.

Metal Powder

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as noted.)

	Cents
Sponge Iron, domestic and foreign, 98% Fe, min. trucklots, freight allowed east of Mississippi River:	
100 mesh, bags	11.50
100 mesh, pails	9.85‡
40 mesh, bags	8.10††
Electrolytic Iron, Melting stock, 99.9% Fe, irreg. fragments, ⅛ in. x 1.3 in.	28.75
(In contract lots of 750 tons price is 22.75c.)	
Annealed, 99.5% Fe..36.75, ton del. east of Mississippi.	
Unannealed (99+% Fe)	33.0
Unannealed (99+% Fe) (minus 325 mesh) ..	58.0
Carbonyl Iron: 90-99.9%, 3 to 20 microns, depending on grade. 88.00-700.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum: Atomized, 600-lb drum freight allowed, c.l. 39.80; ton lots	41.80
Brass, 80/20, leaded (60 mesh)	36.50
Bronze powder, 90/10.	54.20
Copper, all types	15.25*
Lead	7.50*
Manganese, minus 35 mesh	1.00
Nickel, all types ..	0.78-1.06
Nickel-Silver	57.90
Solder	7.50*
Stainless Steel, 304 ...	89.00
Stainless Steel, 316 ...	$1.07
Steel, AISI 4650	32.00
Tin	14.00*
Zinc	23.20
Cobalt:	Dollars
98.5%, minus 100-300 mesh ..	1.57-1.58
99.5%, below 5 microns	2.32
Tungsten	nom.
Molybdenum	4.35

*Plus cost of metal. ‡Depending on mesh. †Cutting and scrafing grades. **Depending on price of ore. ††Welding grade.

Imported Steel

(Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. Source of shipment: Western Europe)

	North Atlantic	Great Lakes	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305 ...	$5.80	$6.05	$5.75	$5.65	$5.95
Bar Size Angles	5.85	6.10	5.80	5.70	6.00
Structural Angles	5.75	6.00	5.70	5.60	5.90
I-Beams	5.70	5.95	5.65	5.55	5.85
Channels	5.70	5.95	5.65	5.55	5.85
Plates (basic bessemer)	5.45	5.80	5.50	5.40	5.70
Sheets, hot rolled and galvanized	Nom.	....	Nom.	Nom.	Nom.
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	25.20	24.70	24.40	24.40	25.20
Barbed Wire (†)	6.35	6.25	6.25	6.10	6.45
Merchant Bars	5.85	6.10	5.80	5.70	6.00
Hot-Rolled Bands	5.95	6.20	5.90	5.80	6.10
Wire Rods, Thomas Commercial No. 5	5.80	5.85	5.75	5.75	6.00
Wire Rods, O.H., No. 5	6.00	6.05	5.95	5.95	6.25
Bright Common Wire Nails (‡)	6.80	7.05	6.75	6.65	6.95

†Per 82 lb net reel. ‡Per 100-lb keg, 20d nails and heavier.

Ores

Lake Superior Iron Ore

(Prices effective for the 1960 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer $11.60
Lump ⅛ in. and up 12.85
Fines, under ⅛ in. 10.72
Mesabi nonbessemer 11.45
Old Range bessemer 11.85
Old Range nonbessemer 11.70
Open-hearth lump 12.70
High phos. 11.45

Based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1960; increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

New Jersey, concentrates ..... nom.

Foreign Iron Ore

Cents per unit

Swedish basic, 65%, c.i.f. Atlantic ports 25.00†
Chilean, 62-65%, c.i.f. Atlantic ports ... 22.00
Brazilian, 68.5% f.o.b. vessel, Victoria, per ton $11.50

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality $16.00-16.50*
Domestic, concentrates, f.o.b. milling points 22.00-23.00

Manganese Ore

Mn 46-48%, Indian, 85-90c, nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1 ..... $34.00-35.00†
48% no ratio ..... 25.00-26.00†

South African Transvaal

44% no ratio 18.75
48% no ratio ..... 24.00-26.00†

Turkish

48% 3:1 ..... 35.00-37.00†

Domestic

Rail nearest seller

18% 3:1 ..... 30.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked $1.23

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard
55-60% $2.70-3.20
60-65% 3.25-3.45

Vanadium Ore

Cents per lb V_2O_5

Domestic 31.00

*Before duty. †Nominal.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace $14.75-15.25
Connellsville, Pa., foundry 18.00-18.50

Oven Foundry

Birmingham, ovens $30.35
Cincinnati, deld. 33.34
Buffalo, ovens 32.00
Chattanooga, Tenn., ovens 30.80
Detroit, ovens 32.00
Pontiac, Mich., deld. 34.05
Saginaw, Mich., deld. 35.63
Erie, Pa., ovens 32.00
Indianapolis, ovens 31.25
Ironton, Ohio, ovens 30.50
Cincinnati, deld. 33.64
Kearny, N. J., ovens 31.25
Milwaukee, ovens 32.00
Neville Island (Pittsburgh), Pa., ovens. 30.75
New Haven, Conn., ovens 31.00
Painesville, Ohio, ovens 32.00
Cleveland, deld. 34.45
Philadelphia, ovens 31.00
St. Louis, ovens 33.00
St. Paul, ovens 31.25
Chicago, deld. 34.78
Swedeland, Pa., ovens 31.00
Terre Haute, Ind., ovens 31.25

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.

Pure benzene 34.00
Xylene, industrial grade 29.00
Creosote 24.00
Naphthalene, 78 deg. 6.00
Toluene, one deg. (deld. east of Rockies) 25.00

Cents per lb, f.o.b. tank cars or tank trucks, deld.

Phenol, 90 per cent grade 14.75

Per ton bulk, f.o.b. cars or trucks, plant.

Ammonium sulfate, regular grade $32.00

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, 10 lb pigs, per gross ton, Palmerton, Pa., 21-23% Mn, $102.50; 19-21% Mn, 1-3% Si, $100; 16-19% Mn $98. For Neville Island, Pa., prices add $2.50. Lump 35 lb and down: Deduct $2 from 10 lb pig prices at Palmerton.

Standard Ferromanganese: (Mn 74-76%, C 7% approx) base price per net ton, $220, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively (Min 79-81%). Lump $228 per net ton, f.o.b. Anaconda, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-95%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 4c for max 0.15% C grade from above prices, 5.3c for max 0.03% C, 6.6c for max 0.5% C, and 8.1c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 24c per lb of contained Mn; packed, carload 25.3c, ton lot 26.9c, less ton 28.1c.

Electrolytic Manganese Metal: Min carload, bulk, 34.25c; 2000 lb to min carload, 37c; less ton, 39c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi River; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Carload, lump, bulk, 1.50% C grade, 18.5-21% Si, 11.6c per lb of alloy. Packed, c.l. 12.8c, ton 13.25c, less ton 14.25c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 16-18.5%, deduct 0.2c from above prices. For 3% grade, Si 12.5-16% deduct 0.5c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 5% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton to 300 lb, $1. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton to 300 lb $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract min c.l. $250 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis. Spot, $255.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4%). Contract, c.l. $300 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed. Spot, $305.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: C.l. lump, bulk, 28.75c per lb of contained Cr. Delivered.

Charge Chrome: Cr 58-65%, C 5-7%, Si 4-6%, S 0.03% max., 20.00c per lb of contained Cr, carlots, lump, bulk, delivered.

Blocking Chrome: Cr 55-63%, C 4-6%, Si 8-12%, 23.50c per lb of contained Cr, delivered in carlots, lump, bulk.

Refined Chrome: Cr 58-65%, C 4.25% max., Si 1.0% max., S 0.03%, 21.00c per lb of contained Cr, carlots, lump, bulk, delivered.

Low-Carbon Ferrochrome (Simplex) Cr 63-66% or 68-71%: C 0.025% max., 31.50c; C 0.010% max., 32.50c per lb of contained Cr, carlots, lump, bulk, delivered.

Cr 68-73%: C 0.25% max., 33.00c. Cr 65-71%: C 0.05% max., 32.00c; C 0.10% max, 31.75c; C 0.20% max, 31.50c; C 0.50% max, 31.25c; C 1.0% max, 31.00c; C 1.5%, 30.75c; C 2.0% max, 30.50c, carlots, lump, bulk, delivered.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%), C.l., 2" x D, bulk 30.8c per lb of contained Cr. Packed, c.l. 32.4c, ton 34.2c, less ton 35.7c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). SM x D, carload, bulk, 20.05c per lb of alloy, carload packed 21.25c, ton lot 22.50c, less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max, 22.50c per lb contained Cr and 14.60c per lb contained Si; Cr. 33-36%, Si 45-48%, C 0.05% max, 22.50c per lb contained Cr, 14.60c per lb contained Si.

Chromium Metal, Electrolytic: Commercial grade (C 99.8% min, metallic basis Fe 0.2% max). Contract, carlot packed, 2" x D plate (above ⅛" thick) $1.15 per lb, ton lot $1.17, less ton lot $1.19. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55% or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5 freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Carload, lump, bulk, 14.6c per lb contained Si. Packed, c.l. 17.1c, ton lot 18.55, less ton 20.20c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Chattanooga, Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Keokuk, Iowa; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Carload, lump, bulk, 15.75c per lb contained silicon, Packed, c.l. 17.75c, ton lot 19.55c, less ton 20.9c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Carload, lump, bulk, 16.9c per lb of contained Si. Packed, c.l. 18.8c, ton lot 20.45c, less ton 21.7c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Carload, lump, bulk, 20c per lb of contained Si. Packed, c.l. 21.65c, ton lot 23.05, less ton 24.1c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 1.00% max Fe, 0.7% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Add 0.5c for 0.50% Fe grade analysing 98.25% min Si.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.85c per lb of alloy; ton lots, packed, 10.85c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l., lump, bulk, 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Carload, bulk, 26.25c per lb of alloy, carload, lump, packed 27.25c, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: 100 lb or more packed (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload, $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Carbortam: (B 1 to 2%). Lump, carload $320 per ton, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETED ALLOYS

Chromium Briquets: (Weighing approx 3½ lb each and containing 2 lb of Cr). Carload, bulk 19.60c per lb of briquet, in bags 20.70c; 3000 lb to c.l. pallets 20.80c; 2000 lb to c.l. in bags 21.90c; less than 2000 lb in bags 22.80c. Delivered. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Carload, bulk 13.7c per lb of briquet; c.l. packed, bags 14.9c; 3000 lb to c.l., pallets 14.9c; 2000 lb to c.l., bags 16.1c; less ton 17c. Delivered. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). C.l. bulk 14c per lb briquet; c.l. packed, bags 15.2c; 3000 lb to c.l., pallets 15.2c; 2000 lb to c.l., bags 16.4c; less ton 17.3. Delivered. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si and small sizes, weighing approx 2½ lb and containing 1 lb of Si). Carload bulk 8c per lb of briquet; packed, bags 9.2c; 3000 lb to c.l., pallets 9.6c; 2000 lb to c.l., bags 10.8c; less ton 11.7c. Delivered. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.49 per lb of Mo contained, f.o.b. Langeloth, Pa.

Titanium Briquets: Ti 98.27%, $1 per lb f.o.b. Niagara Falls, N. Y.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). $5.25 per lb (all quantities) of contained W. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 4% max, C 0.1% max). Ton lots 2" x D, $3.45 per lb of contained Cb; less ton lots $3.50 (nominal). Delivered.

Ferrotantalum Columbium: (Cb 44-77% approx, Ta 15% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $3.05 per lb of contained Cb plus Ta, delivered; less ton lots, $3.10.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Carload, bulk 19.25c per lb of alloy, c.l. packed ½ in. x 12 M 20.00c, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 20c per lb of alloy, ton lot 21.15c; less ton lot 22.4c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

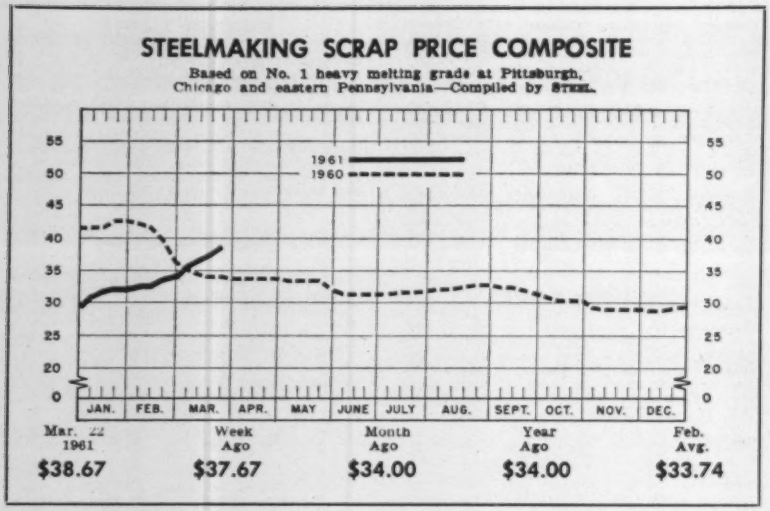
V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.45c per lb of alloy; ton lot 19.95c; less ton lot 21.20c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Siminal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk, 19.25c. Packed c.l. 20.25c; 2000 lb to c.l. 21.25c; less than 2000 lb 21.75c per lb of alloy. Delivered.

Ferrophosphorous: (23-25% based on 24% P content with unitage of $5 for each 1% of P above or below the base). Carload, bulk, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $120 per gross ton.

Ferromolybdenum: (65-75%). Per lb of contained Mo in 2000-lb container, f.o.b. Langeloth and Washington, Pa., $1.76 in all sizes except powdered which is $1.82.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans $1.47; in bags, $1.46, f.o.b. Langeloth and Washington, Pa.



Scrap Price Surge Is Continuing

STEEL's composite on No. 1 heavy melting rises another $1 per ton to $38.67 despite continued absence of active domestic demand. Exports providing market support

Scrap Prices, Page 214

● **Pittsburgh**—Prices are firm for two reasons: Strong demand from Valley mills and brisk export trade. The mills don't need much scrap, and they don't like the prices—but they may go higher. Reason: Brokers have requested a multiple car rate on scrap shipments to Philadelphia. If accepted by the railroads and approved by the ICC, the rate for 50 cars of 50 tons apiece will be cut from $12.58 a ton to $8.06. To prevent scrap from moving East for export, local buyers might have to bid prices up $4 to $5 a ton.

● **Chicago**—The upswing in scrap prices continues. Steelmaking grades advanced about $2 a ton last week on new mill sales. The same applies to railroad specialties and the foundry grades. The market is firm despite a steelmaking rate that is almost stationary and shows little sign of any sizable rise during the next four to six weeks. Good demand for the better grades of scrap for export is contributing appreciably to price strength.

● **Philadelphia**—Steel scrap prices have advanced again. No. 1 heavy melting is quoted $43, delivered, No. 1 bundles and No. 1 busheling $44, and electric furnace bundles $45. Strength is due primarily to export buying; domestic purchases are light. Intake of merchant scrap at yards is better due to more favorable weather, but foreign requirements are eating heavily into supplies. Another stiffening influence is that industrial scrap continues to be produced well below normal volume.

● **New York**—Brokers have increased their buying prices $1 a ton on heavy breakable cast to $29-$30. Prices on all other grades are unchanged. Export buying is strong, and slight improvement in domestic demand is noted.

● **Cleveland**—Slightly better demand for finished steel products is sparking hopes of an upturn in district steelmaking operations. Scrap is moving sluggishly, but prices are holding at the higher levels recently established. Considerable scrap has been stockpiled for export at Lorain, Ohio, awaiting the opening of lake navigation. In the Valley, the most recent sale involved some No. 1 heavy melting industrial material which went at $39.

● **Boston**—Consumption of scrap in New England fell to a postwar low during the first quarter, averaging slightly over 34,000 tons monthly. The ratio of scrap to pig iron in the district steel melt is nearly 3 to 1. Stocks held by consumers are estimated at about 50,000 gross tons. Exports provided chief support to prices during the period.

● **Buffalo**—A price increase of $2 a ton on the cast iron grades highlights the local market. A leading consumer paid $39 for cupola cast, and other cast items were marked up accordingly. Supplies of cast are limited. Rerolling rails continue to display strength. They're up another $1 to a range of $58.50-$59.50. Other mill grades of steel scrap are unchanged.

● **Cincinnati**—While no new buying has been done by the district mills, further price increases are anticipated. Brokers are encountering some price resistance in filling their March commitments. A move is underway to put the Cincinnati market more directly into the export picture by lessened barge rates to New Orleans.

● **St. Louis**—After moving up rapidly a week ago, prices are on a plateau. Scrap is flowing at a better rate, and it's expected the market will hold its present position for at least a couple of weeks. More scrap is coming to market, and the export movement out of the area has slowed down.

● **Birmingham**—Except for the cast iron grades, the market appears to be firming up, reflecting strong export demand. Some pipe shops are using pig iron and foundry steel scrap and plates, but they are not taking much straight cast iron material. There is considerable uncertainty about current prices. One important seller is quoting No. 1 heavy melting at $32-$33, but another insists $33-$34 is more representative of the market.

● **Houston**—A major Texas steel mill placed orders extending through April, pushing prices up sharply. No. 2 heavy melting rose $5 to $36; No. 2 bundles went up $4 to $26; railroad heavy melting advanced $6 to $43; and low phos

plates and structurals (3 ft lengths) went up $6 to $43.

Demand is described as moderate, but it has established the new prices on items that have not been tested much lately. Export prices are also higher, with premiums asked on the better grades.

• San Francisco—Large mills are not buying scrap, but exports are providing considerable support to the market. Better weather and high export prices are bringing larger tonnage to dealers' yards.

• Seattle—The market is firm, and a little more activity is reported. The higher price levels effected at the start of this month are holding. Exporters are actively interested and are stockpiling to meet demands from the Orient.

Iron Ore Imports Decline About 3 Per Cent in 1960

Imports of iron ore (excluding ore containing 10 per cent or more manganese) in 1960 totaled 34,590,812 gross tons, valued at $321,748,391, reports the U. S. Bureau of Mines. Total tonnage was about 3 per cent below the 1959 figure—35,645,649 tons, valued at $312,715,512.

The leading supplying country in both years was Venezuela, followed by Canada and Chile. The breakdown on the basis of supply source:

Iron Ore Imports
(Gross tons)

Source	1960	1959
Angola	.....	16,500
Brazil	1,461,664	1,199,782
British West Africa	45,779	62,071
Canada	10,597,327	13,443,834
Chile	3,944,668	3,607,380
Cuba	2,820	4,172
Denmark	862	800
Dominican Republic	.....	50,370
Iran	1,968	2,756
Western Africa	5,672	.....
Liberia	907,201	1,088,248
Mexico	150,336	106,010
Norway	.....	14,690
Peru	2,761,803	2,270,788
Philippines	1,000	70,998
Portuguese Asia	58,900	.....
Spain	260	209
Surinam	.....	2,320
Sweden	93,753	135,561
United Kingdom	271	18,954
Venezuela	14,559,128	13,550,208
Totals	34,590,812	35,645,649

Scrap Use Tops Pig Iron For Six Straight Months

Domestic consumption of ferrous scrap in January totaled 4,056,000 gross tons, up 8 per cent from the 3,738,385 tons used in December. Pig iron consumption in the month was 3,682,000 tons compared with 3,426,941 tons in the preceding month.

The total furnace charge of scrap and pig iron (7,738,000 tons) consisted of 52 per cent scrap and 48 per cent pig iron—unchanged from December. January was the sixth straight month in which the use of scrap was greater than pig iron.

Domestic consumer stocks of scrap on Jan. 31 were 7,924,000 tons, off 4 per cent from the 8,260,560 tons held at the end of December. Pig iron stocks at 3,289,000 tons were off 2 per cent from those of the preceding month.

Scrapmen Pushing Fight For Lower Freight Rates

The Institute of Scrap Iron & Steel Inc., Washington, is pushing the fight to bring about lower freight rates on iron and steel scrap. Progress in the campaign against 49 eastern railroads was described by William S. Story, assistant executive vice president of the institute, in an address to the Northern California Chapter.

He said the rates on scrap were discriminatory, and the discrimination is damaging the industry in business with domestic mills.

Ulbrich Marketing Shim Stock by New Method

A new method of marketing stainless steel shim stock has been announced by Ulbrich Stainless Steels Inc., Wallingford, Conn. The company has designed a stock dispensing rack with catch-weight coils, so that a customer's requirements for shim stock can be filled to the exact footage required in a matter of minutes, for almost immediate shipment.

As a result of this preplanning, the price for tempered, light gage stainless steel for shim requirements has been materially reduced.

Ulbrich says that as the program develops, additional gages and grades will be made available, providing industry in general with a low cost, off-the-shelf item in the exact quantity desired. It is also planned to make available to distributors these specially designed dispensing racks and packaging methods. Initial stocks are:

Type 301 Stainless (Full Hard Temper)

Gage	Width	Gage	Width
0.001	6 in.	0.005	6 in.
0.002	6 in.	0.006	6 in.
0.003	6 in.	0.008	6 in.
0.004	6 in.	0.010	6 in.

Distributors . . .

Prices, Page 209

While the service centers are disappointed over the volume of business that's coming to them, they report some improvement in orders, with daily shipments running ahead of February's. In the East, structurals appear to be in heaviest demand, while in the South, business is better in merchant bars, plates, and structurals. Welded tubing and tool steel are also moving a little faster.

Midwestern distributors note little change in the market. Business continues spotty, and the anticipated March pickup in orders has been disappointing. Stocks are plentiful in all categories.

In the Southwest, a leading Houston service center reports that foreign prices have held steady this month. On the West Coast, demand is improving, led by heavier movement of galvanized sheets, bars, shapes, and plates. Volume is reported 5 to 10 per cent over that of a month ago.

Structural Shapes . . .

Structural Shape Prices, Page 204

Demand for standard structurals and wide flange beams is quickening as construction activity expands seasonally. Schools, bridges, and other public work account for much of the increased activity.

With agreement in sight for extension of the Massachusetts Turnpike (Weston, Mass., to Boston), more state highway bridges will come out for figures. Also, work on Prudential Center in Boston is expected to be resumed soon. It includes more than 20,000 tons of fabricated structurals.

George A. Fuller Co. and Del E. Webb Construction Co., Los Angeles, have the general contract to build a missile project at Malmstrom Air Base, Great Falls, Mont. It's reported that subcontracts for 12,000 tons of structurals and 20,000

(*Please turn to Page* 219)

Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including brokers' commission, as reported to STEEL, Mar. 22, 1961. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Mar. 22	$38.67
Mar. 15	37.67
Feb. Avg.	33.74
Mar. 1960	34.00
Mar. 1956	50.21

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	34.00-35.00
No. 2 heavy melting	30.00-31.00
No. 1 dealer bundles	34.00-35.00
No. 2 bundles	28.00-29.00
No. 1 busheling	34.00-35.00
No. 1 factory bundles	44.00-45.00
Machine shop turnings	16.00-17.00
Mixed borings, turnings	16.00-17.00
Short turnings	20.00-21.00
Cast iron borings	19.00-20.00
Cut structurals:	
2 ft and under	*40.00-41.00*
3 ft and under	*39.00-40.00*
Heavy turnings	27.00-28.00
Punchings & plate scrap	*42.00-43.00*
Electric furnace bundles	43.00-44.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	37.00-38.00
Stove plate	37.00-38.00
Unstripped motor blocks	*27.00-28.00*
Clean auto cast	*33.00-34.00*
Drop broken machinery	*45.00-46.00§*

Railroad Scrap

No. 1 R.R. heavy melt.	39.00-40.00
Rails, 2 ft and under	52.00-53.00
Rails, 18 in. and under	53.00-54.00
Random rails	46.00-47.00
Angles, splice bars	43.00-44.00
Railroad specialties	46.00-47.00
Rails, rerolling	57.00-58.00

Stainless Steel Scrap

18-8 bundles & solids	180.00-185.00
18-8 turnings	105.00-110.00
430 bundles & solids	90.00-95.00
430 turnings	50.00-55.00

CHICAGO

No. 1 hvy melt., indus.	*39.00-40.00*
No. 1 hvy melt., dealer	*37.00-38.00*
No. 2 hvy melting	*32.00-33.00*
No. 1 factory bundles	*42.00-43.00*
No. 1 dealer bundles	*37.00-39.00*
No. 2 bundles	*25.00-26.00*
No. 1 busheling, indus.	*39.00-40.00*
No. 1 busheling, dealer	*37.00-38.00*
Machine shop turnings	16.00-17.00
Mixed borings, turnings	18.00-19.00
Shovel turnings	18.00-19.00
Cast iron borings	18.00-19.00
Cut structurals, 3 ft	42.00-43.00
Punchings & plate scrap	45.00-46.00

Cast Iron Grades

No. 1 cupola	*44.00-45.00*
Stove plate	*39.00-40.00*
Unstripped motor blocks	*36.00-37.00*
Clean auto cast	*49.00-50.00*
Drop broken machinery	*49.00-50.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*40.00-41.00*
R.R. malleable	*47.00-48.00*
Rails, 2 ft and under	*53.00-54.00*
Rails, 18 in. and under	*54.00-55.00*
Angles, splice bars	*45.00-46.00*
Axles	*60.00-61.00*
Rails, rerolling	*60.00-61.00*

Stainless Steel Scrap

18-8 bundles, solids	175.00-180.00
18-8 turnings	100.00-105.00
430 bundles & solids	85.00-90.00
430 turnings	45.00-50.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*28.00-29.00*
No. 2 heavy melting	*22.00-23.00*
No. 1 bundles	*31.00-32.00*
No. 2 bundles	*20.00-21.00*
No. 1 busheling	*28.00-29.00*
Machine shop turnings	10.00-11.00
Mixed borings, turnings	11.00-12.00
Shovel turnings	12.00-13.00

Cast Iron Grades

No. 1 cupola	*32.00-33.00*
Stove plate	*26.00-27.00*
Heavy breakable	*25.00-26.00*
Unstripped motor blocks	*22.00-23.00*
Charging box cast	*27.00-28.00*
Clean auto cast	*38.00-39.00*

CLEVELAND

No. 1 heavy melting	33.00-34.00
No. 2 heavy melting	21.00-22.00
No. 1 factory bundles	40.00-41.00
No. 1 bundles	34.00-35.00
No. 2 bundles	19.00-20.00
No. 1 busheling	34.00-35.00
Machine shop turnings	12.00-13.00
Shovel turnings	16.00-17.00
Mixed borings, turnings	16.00-17.00
Cast iron borings	16.00-17.00
Cut foundry steel	33.00-34.00
Cut structurals, plate, 2 ft and under	40.00-41.00
Low phos. punchings & plate	35.00-36.00
Alloy free, short shovel turnings	18.00-19.00
Electric furnace bundles	36.00-37.00

Cast Iron Grades

No. 1 cupola	39.00-40.00
Charging box cast	26.00-27.00
Heavy breakable cast	28.00-29.00
Stove plate	36.00-37.00
Unstripped motor blocks	31.00-32.00
Brake shoes	37.00-38.00
Clean auto cast	45.00-46.00
Burnt cast	32.00-33.00
Drop broken machinery	46.00-47.00

Railroad Scrap

R.R. malleable	45.00-46.00
Rails, 2 ft and under	52.00-53.00
Rails, 18 in. and under	52.00-53.00
Rails, random lengths	44.00-45.00
Cast steel	42.00-43.00
No. 1 railroad cast	48.00-49.00
Railroad specialties	47.50-48.50
Angles, splice bars	43.50-44.50
Rails, rerolling	56.00-57.00

Stainless Steel Scrap (Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	155.00-160.00
18-8 turnings	70.00-75.00
430 clips, bundles, solids	70.00-75.00
430 turnings	15.00-25.00

YOUNGSTOWN

No. 1 heavy melting	36.00-37.00
No. 2 heavy melting	24.00-25.00
No. 1 busheling	37.00-38.00
No. 1 bundles	37.00-38.00
No. 2 bundles	22.00-23.00
Machine shop turnings	14.00-15.00
Shovel turnings	19.00-20.00
Cast iron borings	19.00-20.00
Low phos.	39.00-40.00
Electric furnace bundles	39.00-40.00

Railroad Scrap

No. 1 R.R. heavy melt.	40.00-41.00

BUFFALO

No. 1 heavy melting	29.00-30.00
No. 2 heavy melting	24.00-25.00
No. 1 bundles	29.00-30.00
No. 2 bundles	20.00-21.00
No. 1 busheling	29.00-30.00
Shovel turnings	16.00-17.00
Machine shop turnings	12.00-13.00
Cast iron borings	14.00-15.00
Low phos. structurals and plates, 2 ft and under	39.00-40.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	*38.00-39.00*
No. 1 machinery	*45.00-46.00*

Railroad Scrap

Rails, random lengths	42.00-43.00
Rails, 3 ft and under	48.00-49.00
Rails, rerolling	*58.50-59.50*
Railroad specialties	41.00-42.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	30.00-31.00
No. 2 heavy melting	27.50-28.50
No. 1 bundles	31.00-32.00
No. 2 bundles	21.00-22.00
No. 1 busheling	30.00-31.00
Machine shop turnings	11.00-12.00
Mixed borings, turnings	12.00-13.00
Shovel turnings	13.00-14.00
Cast iron borings	11.00-12.00
Low phos. 18 in.	37.00-38.00

Cast Iron Grades

No. 1 cupola	36.00-37.00
Heavy breakable cast	28.00-29.00
Charging box cast	35.00-36.00
Drop broken machinery	46.00-47.00

Railroad Scrap

No. 1 R.R. heavy melt.	33.00-34.00
Rails, 18 in. and under	46.00-47.00
Rails, random lengths	40.00-41.00

PHILADELPHIA

No. 1 heavy melting	*43.00*
No. 2 heavy melting	38.00
No. 1 bundles	*44.00*
No. 2 bundles	28.00
No. 1 busheling	*44.00*
Electric furnace bundles	*45.00*
Mixed borings, turnings	15.00
Shovel turnings	21.00
Machine shop turnings	14.00
Heavy turnings	25.00†
Structurals & plates	*44.00-46.00*
Couplers, springs, wheels	*46.00*
Rail crops, 2 ft & under	*52.00-54.00*

Cast Iron Grades

No. 1 cupola	39.00
Heavy breakable cast	*41.00*
Drop broken machinery	*50.00-51.00*
Malleable	46.00†

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	29.00-30.00
No. 2 heavy melting	22.00-23.00
No. 1 bundles	29.00-30.00
No. 2 bundles	18.00-19.00
Machine shop turnings	3.50-4.00†
Mixed borings, turnings	4.00-4.50†
Shovel turnings	5.00-6.00†
Low phos. structurals & plates	32.00-33.00

Cast Iron Grades

No. 1 cupola	34.00-35.00
Unstripped motor blocks	23.00-24.00
Heavy breakable	*29.00-30.00*

Stainless Steel

18-8 sheets, clips, solids	155.00-160.00
18-8 borings, turnings	70.00-75.00
410 sheets, clips, solids	40.00-45.00
430 sheets, clips, solids	55.00-60.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	23.00-24.00
No. 2 heavy melting	19.00-20.00
No. 1 bundles	23.00-24.00
No. 1 busheling	23.00-24.00
Machine shop turnings	5.00-6.00
Shovel turnings	9.00-9.50
No. 1 cast	39.00-40.00
Mixed cupola cast	30.00-30.50
No. 1 machinery cast	40.00-42.00

BIRMINGHAM

No. 1 heavy melting	32.00-33.00
No. 2 heavy melting	23.00-24.00
No. 1 bundles	32.00-33.00
No. 2 bundles	20.00-21.00
No. 1 busheling	32.00-33.00
Cast iron borings	10.00-11.00
Machine shop turnings	16.00-17.00
Shovel turnings	18.00-19.00
Bar crops and plates	38.00-39.00
Structurals & plate	37.00-38.00
Electric furnace bundles	34.00-35.00
Electric furnace:	
3 ft and under	34.00-35.00
2 ft and under	35.00-36.00

Cast Iron Grades

No. 1 cupola	45.00-46.00
Stove plate	45.00-46.00
Unstripped motor blocks	32.00-33.00
No. 1 wheels	35.00-36.00

Railroad Scrap

No. 1 R.R. heavy melt.	33.00-34.00
Rails, 18 in. and under	45.00-46.00
Rails, random lengths	38.00-39.00
Angles, splice bars	38.00-39.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	35.00
No. 2 heavy melting	29.00
No. 1 bundles	35.00
No. 2 bundles	26.00
No. 1 busheling	35.00
Machine shop turnings	*14.00*
Shovel turnings	*16.00*

Cast Iron Grades

No. 1 cupola	40.00
Charging box cast	35.00
Heavy breakable cast	33.00
Unstripped motor blocks	35.00
Clean auto cast	41.00
Stove plate	35.00

Railroad Scrap

No. 1 R.R. heavy melt.	*37.00*
Rails, random lengths	39.00†
Rails, rerolling	52.00
Rails, 18 in. and under	*41.00*
Angles, splice bars	40.00†

HOUSTON

(Brokers' buying prices; f.o.b. car)

No. 1 heavy melting	35.00-36.00†
No. 2 heavy melting	*36.00*
No. 1 bundles	*37.00-38.00*
No. 2 bundles	*26.00*
Machine shop turnings	7.00-8.00†
Low phos. plate & structurals:	
3 ft	*43.00*
2 ft and under	40.00-41.00

Cast Iron Grades

No. 1 cupola	36.00-37.00
Heavy breakable	24.00
Foundry malleable	29.00-30.00†
Unstripped motor blocks	30.00-31.00

Railroad Scrap

R.R. heavy melt. (3 ft)	*43.00*

LOS ANGELES

No. 1 heavy melting	*40.00*
No. 1 hvy melt (export)	40.00-43.00
No. 2 heavy melting	*38.00*
No. 2 hvy melt (export)	*40.00*
No. 1 bundles	*34.00*
No. 2 bundles	24.00-27.00
No. 2 bundles (export)	*29.00*
Machine shop turnings	12.00
Shovel turnings	13.00
Cast iron borings	13.00
Cut structurals and plate 1 ft and under	*43.00*

Cast Iron Grades

No. 1 cupola	46.00

Railroad Scrap

No. 1 R.R. heavy melt.	34.00-36.00

PORTLAND, OREG.

(Prepared, f.o.b. car)

No. 1 heavy melting	41.00
No. 2 heavy melting	38.00
No. 2 bundles	23.00-24.00
Shovel turnings	13.00
Electric furnace bundles	45.00-47.00

Cast Iron Grades

No. 1 cupola	44.00
Heavy breakable	39.00
Unstripped motor blocks	36.00
Stove plate (f.o.b. plant)	39.00

SEATTLE

(Prepared, f.o.b. car)

No. 1 heavy melting	41.00
No. 1 hvy (unprepared)	38.00
No. 2 heavy melting	38.00
No. 2 hvy (unprepared	35.00
No. 2 bundles	23.00-24.00
Shovel turnings	15.00
Electric furnace bundles	47.00

Cast Iron Grades

No. 1 cupola	42.00
Heavy breakable cast	39.00
Unstripped motor blocks	36.00
Stove plate (f.o.b. plant)	39.00

SAN FRANCISCO

No. 1 heavy melting	40.00**
No. 2 heavy melting	37.00**
No. 1 bundles	34.00**
No. 2 bundles	25.00**
Machine shop turnings	20.00**
Mixed borings, turnings	20.00**
Cast iron borings	20.00**
Heavy turnings	20.00**
Shovel turnings	20.00**
Cut structurals, 3 ft	40.00

Cast Iron Grades

No. 1 cupola	*46.00-47.00*
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	45.00-46.00
No. 1 wheels	34.00

HAMILTON, ONT.

(Brokers' buying prices; net tons)

No. 1 heavy melting	28.00
No. 2 hvy melt, 2 ft & under	27.00
No. 1 bundles	28.00
No. 2 bundles	17.50
Mixed steel scrap	20.00
Mixed borings, turnings	12.00
Busheling, new factory:	
Prepared	28.00
Unprepared	22.00
Shovel turnings	12.00

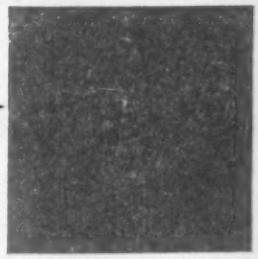
Cast Iron Grades‡

No. 1 machinery cast	32.00

*For export add $4 dock charge.
**Based mainly on export sales.
†Nominal.
‡F.o.b. Hamilton, Ont.
§Delivered.

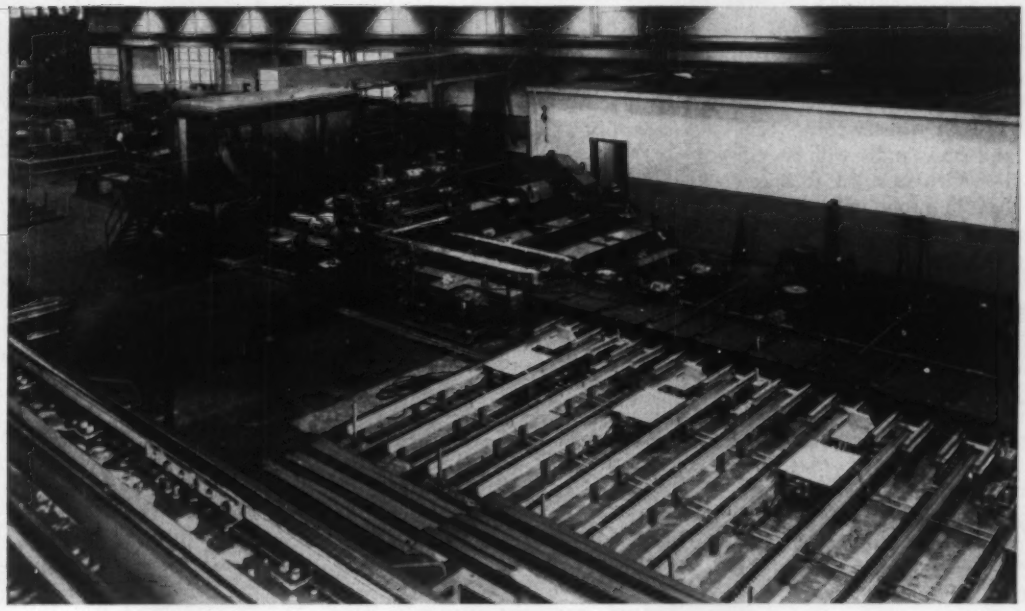
WESTERN ELECTRIC

rolls billets this small



and flats this thin

on **BIRDSBORO** 18″ two-high Reversing Hot Mill



Birdsboro 18″ reversing hot mill at the Hawthorne Works of Western Electric Co., Inc., Cicero, Ill.

• This Birdsboro mill rolls 1½″ and 2½″ square billets . . . various flats (including one 7″ wide by .375″ thick) . . . from ferrous alloys containing nickel, cobalt and vanadium!

• With all the engineering features of larger blooming mills, it mechanizes many operations formerly done on set pass mills.

• Not all Birdsboro mill machinery is this small. But—small or large—all deliver big advantages. For specifics, please write *Sales Department, Engineering Department and Mfg. Plant:* Birdsboro, Pa., *District Office:* Pittsburgh, Pa.

MM93-60

BIRDSBORO

CORPORATION BIRDSBORO, PENNA.

STEEL MILL MACHINERY • HYDRAULIC PRESSES • CRUSHING MACHINERY • SPECIAL MACHINERY • ROLLS • ELECTRIC STEEL CASTINGS: Carbon, Low Alloy and STAINLESS STEEL

Antitrusters Move In on Copper, Brass

Nonferrous Metal Prices, Pages 218 & 219

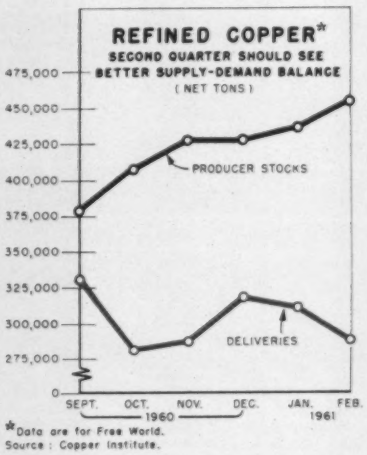
THE EAGLE EYE of the Justice Department's Antitrust Division will focus on the copper and brass industry next month. On Apr. 17, a federal grand jury in Hartford, Conn., will begin to investigate whether some of the copper companies and brass mills are violating antitrust laws.

• **Hush Hush**—The Justice Department is keeping mum on what directions the probe will take or what touched off the investigation. A spokesman does say, however, that officials of both primary copper companies and brass mills will be subpoenaed—which has led to speculation that the probe will center on the relationship between the primary producers and their wholly owned brass mill subsidiaries.

Rumors abound that the pricing of brass mill products is one area the grand jury will investigate. It's hard to conceive of a more unlikely candidate for price fixing. With its tremendous overcapacity and the high level of imports that have flooded the market in recent years, the brass mill industry is intensely competitive. The situation has led to heavy price fighting last year and this. Profit statements spell out just how severe the price slashing has become.

Another possible area of investigation: It may be argued that "captive" mills are in a better position to adjust prices to competitive circumstances of the moment than the independents because profits of the parent company are only partially determined by how well the mill does.

• **More on Way?**—The Justice Department is evidently living up to the promise it made during the Eisenhower administration that it would step up its investigations in the metals field. Earlier this year, Justice initiated an antitrust action against American Smelting & Refining Co. to make that company give up its minority stock holdings in Revere Copper & Brass Inc. and General Cable Corp. Last spring, Justice ordered Aluminum Co. of America to divest itself of Rome Cable Co. In June, 1959, Justice brought action against Kennecott Copper Corp. for its acquisition of Okonite Co. In a related action, the Federal Trade Commission ordered Reynolds Metals Co. to divest itself of Arrow Brands Inc. (a West Coast foil subsidiary).



In all cases, the companies have filed appeals.

More investigations will be underway soon, hints Justice.

Copper Sales Better

Statistics just released by the Copper Institute show that the February copper market shaped up like this: Deliveries of refined metal in the U. S., at 93,029 tons, were up on a day to day basis, even though the total was off from January's because of the shorter month. The same was true of Free World deliveries (see chart). Refined production ran at about the same daily rate as it did in January. Producers' stocks continued to mount: They hit 147,799 tons in this country and 308,692 tons outside the U. S. The Free World total: 456,491 tons.

In the Markets

• **Magnesium Mixed**—Shipments of primary magnesium continue to outrace production as producer stocks are worked off. Output in January was 3255 tons, shipments 4090 tons, reports the Magnesium Association. January wrought product shipments leaped to 829 tons compared with 598 tons in December.

• **Brass Ingots Still Dull**—Demand continues slow for brass and bronze ingots. February shipments were 17,787 tons, January 18,807 tons, reports the Council of the Ingot Brass & Bronze Industry.

• **Aluminum Exports Down** — Exports, the mainstay of the aluminum market in 1960, haven't gotten off to as good a start this year. January exports of crude metal fell 35 per cent below December's to 16,550 tons. That seems to back up earlier predictions that export sales in 1961 would fall from the record 284,980 tons of last year. Scrap exports, however, continued to hold up, hitting 6450 tons in January compared with 6400 tons in December.

• **'60 Good for Tin**—The tin plate industry had a record production year of 1.5 million short tons in 1960. That upped the industry's consumption of tin by 32 per cent to 33,363 long tons, reports the U. S. Bureau of Mines. Preliminary figures indicate domestic tin consumption was 80,350 long tons (51,825 primary, 28,525 secondary) compared with 1959's total of 77,375 long tons (45,835 primary, 31,540 secondary).

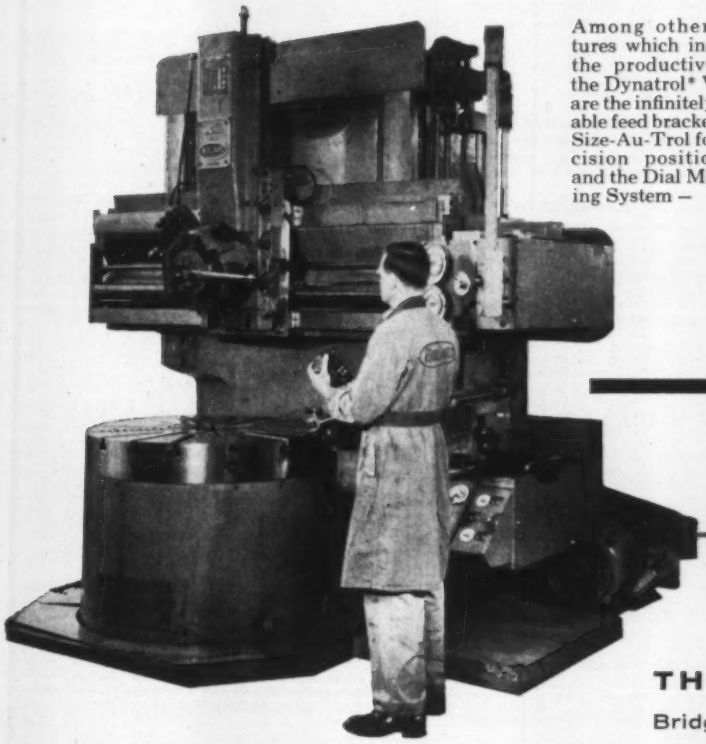
FINGER-TIP CONTROL

Increases Productivity of...

BULLARD

DYNATROL*
VERTICAL TURRET LATHES

Directional control of all head motions in feed on traverse, either horizontally, vertically or at any 45° angle, as well as table start and stop from a lightweight portable pendant, is a distinct production advantage.



Among other features which increase the productivity of the Dynatrol* V.T.L. are the infinitely variable feed bracket with Size-Au-Trol for precision positioning, and the Dial Measuring System –

It allows the operator to always be in the most advantageous position in relation to the work and eliminates the necessity of climbing for buttons or levers. By reducing operator fatigue and increasing his efficiency, more metal is removed per hour with a lower cost per piece.

*TRADE MARK

ask your Bullard Sales Engineer for the complete Dynatrol story or write for catalog.

THE BULLARD COMPANY

Bridgeport 9, Conn., Telephone EDison 6-2511

YOU CAN'T BEAT A BULLARD

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, 50 lb ingots, 26.00, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 13, 25.90; No. 43, 26.20; No. 195, 27.60; No. 214, 31.50; No. 356, 26.80, 50 lb ingots.

Antimony: R.M.M. brand, 99.5%, 29.00; Lone Star brand, 29.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 28.50-29.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $70.00 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $65 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.60 per lb deld.

Cobalt: 99+%, $1.50 per lb for 500-lb keg; $1.52 per lb for 100 lb case; $1.57 per lb under 100 lb.

Columbium: Powder, $55 per lb and up nom.

Copper: Electrolytic, 29.00 deld.; custom smelters, 29.00; lake, 29.00 deld.; fire refined, 28.75 deld.

Germanium: First reduction, ingots, less than 1 kg, 36.00-37.50 per gram; 1-10 kg, 30.50-32.00 per gram; 10 kg or more, 28.10-29.99 per gram; intrinsic grade, under 10 kg, 31.95 per gram; 10 kg or more, 29.95 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $70-75 per troy oz nom.

Lead: Common, 10.80; chemical, 10.90; corroding, 10.90; St. Louis, New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 24 lb, $11 per lb deld.; 24-90 lb, $9.50; 100-499 lb, $9.25; 450 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex., 1.3 in. diam. x 12 in. sticks, 57.00 f.o.b. Madison, Ill.

Magnesium Alloy: AZ91A (diecasting), 40.75; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, N. York, $206-208 per 76 lb flask.

Molybdenum: Unalloyed forging billets, 4.125-8.5 in. diam., 50-4999 lb, $8.15 per lb, depending on quantity; 5000 lb or more, $8 per lb, f.o.b. Coldwater, Mich.

Nickel: Electrolytic cathodes, briquettes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, in kegs, 74.50; "F" nickel, 5 lb ingots, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01; Exton, Pa., basis, add 1.60. Nickel oxide sinter at Buffalo, New York, or other established U. S. ports of entry, contained nickel 69.60.

Osmium: $70-90 per troy oz nom.

Palladium: $24-26 per troy oz.

Platinum: $82-85 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $137-140 per troy oz.

Ruthenium: $55-60 per troy oz.

Selenium: $6.50-7 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l. 20.00; 5 and 12 lb bricks, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.

Tantalum: Melting stock, $35 per lb; rod $60 per lb nom; sheet, $55 per lb nom.

Tellurium: $3.50-5 per lb, 100 lb or more.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot, 104.125; prompt, 103.875.

Titanium: Sponge, 99.3+% grade A-1, ductile (0.3% Fe max.), $1.60 per lb; grade A-2 (0.5% Fe max), $1.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 100-lb lots, $2.75-2.85 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00c; 99+% hydrogen reduced, $3.10-4.00.

Zinc: Prime western, 11.50; brass special, 11.75; intermediate, 12.00, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 12.85; special high grade, 13.00 deld. Die casting alloy ingot No. 3, 14.25; No. 2, 14. 75; No. 5, 14.50 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $8-8.50 per lb; 100-500 lb, $7.25-7.50 per lb; 500-1000 lb, $6.50-7.25; over 1000 lb, $6.50 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 25.00-26.00; No. 12 foundry alloy (No. 2 grade), 22.75; 5% silicon alloy, 0.60 Cu max., 24.00; 13 alloy, 0.60 Cu max., 24.00; 195 alloy, 25.75; 108 alloy, 23.25. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 23.75; grade 2, 22.50; grade 3, 21.50; grade 4, 21.00.

Brass Ingot: Red brass, No. 115, 28.25; tin bronze, No. 225, 38.00; No. 245, 32.50; high leaded tin bronze, No. 305, 32.75; No. 1 yellow, No. 405, 24.25; manganese bronze, No. 421, 28.00.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.25; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.935, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.935, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 34.355; l.c.l., 34.98. Weatherproof, 20,000-lb lots, 35.55; l.c.l., 36.30.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $16.50 per cwt; pipe, full coils, $16.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $6.75-15.50; sheared mill plate, $5.25-9.00; wire, $5.55-9.50; forging billets, $3.20-4.75; hot-rolled and forged bars, $3.80-6.25.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 28.00; ribbon zinc in coils, 22.50; plates, 21.50.

ZIRCONIUM

Plate, $14.00-25.00; H.R. strip, $14.00-22.90; C.R. strip, $16.00-35.00; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	138	120	138
Strip, C.R.	124	108	138
Plate, H.R.	130	110	126
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

(Selected products and sizes)

Flat Sheets: 1100, 3003, and 5005, mill finish, 30,000 lb base f.o.b. customer custody.

Thickness Range (in.)	Width (in.)	Length Range (in.)	Price Range
0.250-0.136	24-72	72-180	45.40-48.00
0.136-0.096	24-72	72-180	45.90-48.80
0.096-0.077	24-72	72-180	46.40-50.30
0.077-0.068	24-72	72-180	46.90-52.10
0.068-0.061	24-72	72-180	46.90-55.00
0.061-0.048	24-72	72-180	47.40-57.70
0.048-0.038	24-72	72-180	47.90-60.50
0.038-0.030	24-72	72-180	48.40-65.30
0.030-0.024	24-72	72-180	48.90-67.20
0.024-0.019	24-60	72-180	49.40-59.90
0.019-0.017	24-48	72-144	50.30-57.00
0.017-0.015	24-48	72-144	51.20-58.00
0.015-0.014	24-36	72-144	52.30
0.014-0.012	24-36	72-144	53.50
0.012-0.011	24-36	72-144	54.60
0.011-0.0095	24-46	72-144	56.20
0.0095-0.0085	24-36	72-96	57.50
0.0085-0.0075	24-36	72-96	59.20
0.0075-0.007	24-36	72-96	60.80
0.007-0.006	24-36	72-96	62.50

ALUMINUM (continued)

Plates and Circles: Thickness, 0.25-3 in.; width or diam., 24-60 in.; length, 72-240 in., mill finish.

Alloy	Plate Base	Circle Base
1100, 3003-F	44.60	50.90
5050-F	45.70	50.50
3004-F	46.70	52.40
5052-F	47.30	53.10
6061-T6	47.80	53.90
2024-T4*	51.80	58.90
7075-T6*	60.50	67.90

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 base, 12 ft lengths.

Diam (in.)*	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
0.125	74.90	77.30	....	....
0.188	63.20	63.20	....	80.10
0.250	60.00	62.60	72.70	74.10
0.375	59.20	63.80	71.00	72.00
	2011-T3	2017-T451	2011-T3	2017-T451
0.500	59.20	63.80	71.00	72.00
0.625	59.20	63.80	67.80	67.90
0.750	57.70	62.00	61.60	63.80
0.875	57.70	62.00	61.60	63.80
1.000	57.70	62.00	61.60	63.80
1.125	55.30	59.50	59.50	61.50
1.250	55.30	59.50	59.50	61.50
1.375	55.30	59.50	59.50	61.50
1.500	55.30	59.50	59.50	61.50
1.625	53.00	56.70	....	59.30
1.750	53.00	56.70	58.30	59.30
1.875	53.00	56.70	....	59.30
2.000	53.00	56.70	58.30	59.30
2.250	51.50	55.00	....	59.30
2.500	51.50	55.00	....	59.30
2.750	49.90	53.20	....	59.30
3.000	49.00	53.20	....	59.30
3.250	....	53.20	....	....
3.375	....	53.20	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random length, diam., 0.375-8 in., "F" temper; 2014, 47.50-57.60; 6061, 43.50-57.60; 7075, 61.80-71.90; 7079, 66.80-76.90.

Pipe: ASA schedule 40, alloy 6063-T6, 3-40 ft lengths, plain ends, 90,000 lb base, dollars per ft. Nominal pipe sizes: 1 in., 32.00; 1¼ in., 43.40; 1½ in., 51.80; 2 in., 62.60; 3 in., 124.95; 4 in., 171.80; 5 in., 233.15; 6 in., 308.55; 8 in., 464.35; 10 in., 716.25 (3-24 ft lengths).

Factor	Alloy 6063-T5	Alloy 6062-T6
1-14	45.30-46.80	54.00-60.00
15-17	45.30-46.80	56.50-61.80
18-23	45.80-47.50	58.60-67.60
24-32	45.80-47.50	66.80-81.50
33-38	49.50-52.20	85.10-96.60
39-44	59.80-63.60	102.00-124.00

MAGNESIUM

Sheets and Plates: AZ31B standard grades, .032 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.00 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24.72 in. widths; .125 in., 74.90; .188 in., 71.70-72.70; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.00 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grades (AZ31B)
6-8	65.30-67.60	84.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-68.40	90.60-91.30
36-38	71.50-75.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 22.00-22.50; No. 2 heavy copper and wire, 20.75-21.25; light copper, 18.25-18.75; No. 1 composition red brass, 18.50-19.00; No. 1

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES e (Based on copper at 29.00c)		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes	Clean Heavy	Rod Ends	Clean Turnings
Copper	54.13b	51.36c	....	55.32	25.000	25.000	24.250
Yellow Brass	48.10	33.71d	48.39	52.26	19.250	18.375	17.375
Low Brass, 80%	50.65	50.39	50.94	54.71	21.375	21.125	20.625
Red Brass, 85%	51.54	51.48	51.83	55.60	22.250	22.000	21.500
Com. Bronze, 90%	52.98	52.92	53.27	56.79	23.000	22.750	22.250
Manganese Bronze	56.56–56.59	50.22–50.24	60.47	....	18.000	17.750	17.250
Muntz Metal	50.94	46.25	....	....	18.125	17.875	17.375
Naval Brass	52.86	46.67	59.17	57.02	18.000	17.750	17.250
Silicon Bronze	59.49	58.68	58.78	77.90	24.500	24.250	23.500
Nickel Silver, 10%	63.66	65.99	65.74	....	24.125	23.875	12.062
Phos. Bronze, A-5%	74.59	75.09	74.34	76.52	26.125	25.875	24.875

a. Cents per lb, f.o.b. mill; freight allowed on 50 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time of any or all kinds of scrap, add 1 cent per lb.

composition turnings, 17.50-18.00; new brass clippings, 15.75-16.25; light brass, 12.75-13.25; heavy yellow brass, 13.75-14.25; new brass rod ends, 14.75-15.25; auto radiators, unsweated, 14.00-14.50; cocks and faucets, 15.50-16.00; brass pipe, 16.00-16.50.

Lead: Soft scrap lead, 7.00-7.50; battery plates, 2.75; linotype and stereotype, 8.00-8.25; electrotype, 7.50-7.75; mixed babbitt, 9.50-10.00.

Monel: Clippings, 23.00-23.50; old sheets, 22.00-23.00; turnings, 16.50-17.00; rods, 22.00-23.00.

Nickel: Sheets and clips, 52.00-54.00; rolled anodes, 52.00-54.00; turnings, 40.00; rod ends, 52.00-54.00.

Zinc: Old zinc, 2.75-3.00; new diecast scrap, 2.75-3.00; old diecast scrap, 1.00-1.25.

Aluminum: Old castings and sheets, 9.00-9.50; clean borings and turnings, 4.50-5.00; segregated low copper clips, 11.00-11.50; segregated high copper clips, 10.00-10.50; mixed low copper clips, 10.50-11.00; mixed high copper clips, 10.00-10.50.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 10.00-10.50; clean borings and turnings, 7.50-8.00; segregated low copper clips, 15.50-16.00; segregated high copper clips, 13.50-14.00; mixed low copper clips, 13.00-13.50; mixed high copper clips, 12.00-12.50.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 10.50-11.00; clean borings and turnings, 8.50-9.00; segregated low copper clips, 14.00; segregated high copper clips, 13.00; mixed low copper clips, 13.00; mixed high copper clips, 12.50.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)
Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 55.00; light scrap, 50.00; turnings and borings, 35.00.
Copper and Brass: No. 1 heavy copper and wire, 25.50; No. 2 heavy copper and wire, 23.50; light copper, 21.25; refinery brass (60% copper) dry copper content, 22.00.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 25.50; No. 2 heavy copper and wire, 23.75; light copper, 21.50; No. 1 composition borings, 21.00-21.50; No. 1 composition solids, 21.50-22.00; heavy yellow brass solids, 16.50-17.50; yellow brass turnings, 14.50-16.50; radiators, 17.00-17.50.

Plating Material

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.60.
Copper: Flat-rolled, 46.04; oval, 42.50; electrodeposited, 38.00; cast, 40.50; 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 122.50; 200-499 lb, 121.00; 500-999 lb, 120.50; 1000 lb or more, 120.00.

Zinc: Balls, 18.75; flat tops, 18.75; flats 21.50; ovals, 20.75, ton lots.

CHEMICALS

Cadmium Oxide: $1.60 per lb in 100-lb drums.

Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,000 lb, 61.90.

Copper Sulphate: 100-1900 lb, 15.00; 2000-5900 lb, 13.00; 6000-11,900 lb, 12.75; 12,000-22,900 lb, 12.50; 23,000 lb or more, 12.00.

Nickel-Chloride: 100 lb, 45.00 200 lb, 43.00; 300 lb, 42.00; 400-4900 lb, 40.00; 500-9900 lb, 38.00; 10,000 lb or more, 37.00.

Nickel Sulphate: 5000-22,999 lb, 29.00; 23,000-39,900 lb, 28.50; 40,000 lb or more, 28.00.

Sodium Cyanide (Cyanobrik): 2000 lb, 23.80; 400-900 lb, 20.80; 1000-4900 lb, 19.80; 5000-19,900 lb, 18.80; 20,000 lb or more, 17.60.

Sodium Stannate: Less than 100 lb, 80.60; 100-600 lb, 71.20; 700-1900 lb, 68.40; 2000-9900 lb, 66.60; 10,000 lb or more, 65.20.

Stannous Chloride (Anhydrous): 25 lb, 156.20; 100 lb, 151.40; 400 lb, 148.90; 800-19,900 lb, 108.00; 20,000 lb or more, 102.00.

Stannous Sulphate: Less than 50 lb, 141.30; 50 lb, 111.30; 100-1900 lb, 109.30; 2000 lb or more, 107.30.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(*Concluded from Page 213*)

tons of reinforcing bars went to American Bridge Div., U. S. Steel.

The Tennessee Valley Authority awarded a $1,001,761 contract (structurals) to U. S. Steel's American Bridge Div. for the Widow's Creek Steam Plant.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

12,000 tons or more, Minuteman missile project, Malmstrom Air Field, Great Falls, Mont., to American Bridge Div., U. S. Steel Corp., Pittsburgh.

2200 tons, service building, Columbia-Presbyterian Hospital, New York, to Bethlehem Steel Co., Bethlehem, Pa.

300 tons, Hanford Works construction, to Pacific Car & Foundry Co., Seattle; H. Halvorson, Yardley, Wash., general contractor.

225 tons, distribution house addition, Western Electric Co., Denver, to Midwest Steel & Iron Works, Denver.

150 tons, transmission towerwork, American Electric Power Co., Chatham and Savage, Ky., to Bethlehem Steel Co., Bethlehem, Pa.

100 tons, radar tower, Ft. Lawton, Wash. (Seattle); E. F. Schuck Construction Co., Seattle, general contractor; to Pacific Coast Div., Bethlehem Steel Co., Seattle.

STRUCTURAL STEEL PENDING

7490 tons, state highway bridge over Hackensack River, Bergen County, New Jersey; American Bridge Div., U. S. Steel Corp., Pittsburgh, low bidder.

1300 tons, approaches, second Lake Washington floating bridge, Seattle; bids to the State Highway Department, Olympia, Wash., Apr. 18.

910 tons, Goose Neck bridge over Shrewsbury River, Monmouth County, New Jersey; Public Constructors low on the general contract.

715 tons, Public School No. 74, New York; bids closed.

475 tons, state bridge, Monroe County, Pennsylvania; D. A. Kessler Construction Co., Mt. Carmel, Pa., low on the general contract; work may go prestressed concrete.

450 tons, Riddle Memorial Hospital, Media, Pa.; bids closed Mar. 23.

400 tons, shopping center, Greenville, Del.; bids closed Mar. 23.

380 tons, students center, Drexel Institute, Philadelphia; bids Mar. 30.

370 tons, Washington State, Tilton River bridge, Lewis County; Troy T. Burnham, Seattle, awarded general contract at $442,320.

330 tons, state bridgework, FINIE 61-1, Niagara County, New York; bids Mar. 29.

219 tons, state bridgework, Schuylkill County, Pennsylvania; bids Apr. 7; 101 tons of reinforcing bars also required.

172 tons, state bridgework, Fulton County, Pennsylvania; bids Apr. 7.

170 tons, trashracks, Flaming Gorge Dam, Colorado River storage project; bids Mar. 30 to Bureau of Reclamation, Denver.

160 tons, Students Union Bldg., Brooklyn College.

150 tons, building 182 N, Hanford Works, Washington State; bids in to the Atomic Energy Commission.

145 tons, state bridgework, RC 61-16 and FASS 61-1, Suffolk County, New York; Davis Construction Corp. low bidder on general contract.

134 tons, state bridgework, Fulton County, Pennsylvania; Latrobe Road Construction Inc., Latrobe, Pa., is low on the general contract; job may go prestressed concrete.

103 tons, state bridgework, FINIE 61-3, Niagara County, New York, bids Mar. 29.

103 tons, state bridgework, Lucerne County, Pennsylvania; A. C. Hack & Son Inc., Bloomsburg, Pa., is low on the general contract; job may go prestressed concrete.

100 tons, Nike Hercules installation, Kitsap County, Washington; bids to the U. S. Engineer, Seattle, Apr. 20.

100 tons, Othello, Wash., radar tower; general contract to Northern Pacific Corp., Spokane, Wash., low at $196,799 to the U. S. Engineer, Seattle.

100 tons, state bridgework, Cambria County, Pennsylvania; bids Apr. 7.

80 tons, also reinforcing steel, Washington State girder bridge, Cowlitz County; bids to Olympia, Wash., Apr. 4.

Unstated, $1.5 million bank structure, for Federal Savings & Loan Association, Tacoma, Wash.; bids Mar. 21; Lea, Pearson & Richards, Tacoma, architect.

REINFORCING BARS . . .

REINFORCING BARS PLACED

20,000 tons or more, Minuteman Man missile project, Malmstrom Air Field, Great Falls, Mont., to American Bridge Div., U. S. Steel Corp.; general contract to George A. Fuller

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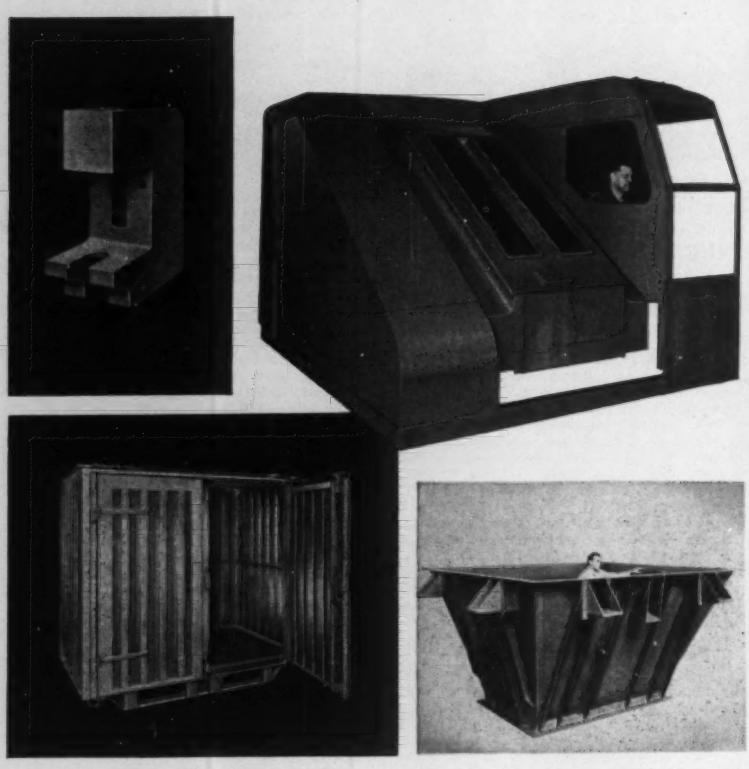

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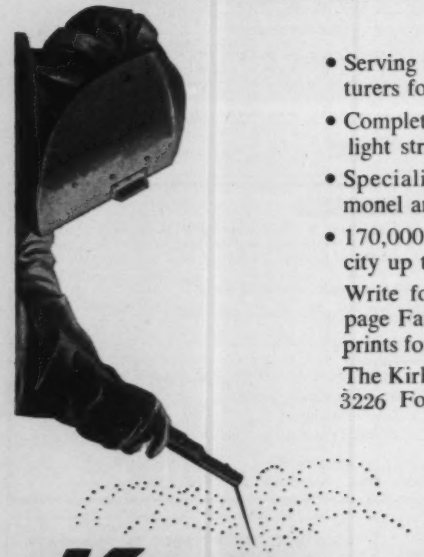

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Co. and Del E. Webb Construction Co., Los Angeles, on negotiated joint bid of $61,773,644 by U. S. Engineer.

350 tons, remodeling Civic Auditorium, Seattle, to Joseph T. Ryerson & Son Inc., Seattle; Brazier Construction Co., Seattle, general contractor.

200 tons, prestressed concrete, Science Building, Century 21 Exposition, Seattle, to Pacific Coast Div., Bethlehem Steel Co., Seattle.

167 tons, perimeter building, Seattle Century 21 Exposition, to Pacific Coast Div., Bethlehem Steel Co., Seattle; Dahlgren Construction Co., Seattle, general contractor.

86 tons, men's dormitory, University of Alaska, College, Alaska, to Pacific Coast Div., Bethlehem Steel Co., Seattle; Hebb & Narorick Construction Co. Inc., Seattle, general contractor.

REINFORCING BARS PENDING

1400 tons, approaches to the second Lake Washington floating bridge, Seattle; bids to Olympia, Wash., Apr. 8; also required, prestressed girders.

335 tons, guide wall, Ice Harbor project, Columbia River; General Construction Co., Portland, Oreg., low at $636,000 to the U. S. Engineer, Walla Walla, Wash.

235 tons, Washington State, Tilton River bridge, Lewis County; general contract to Troy T. Burnham, Seattle.

124 tons, two, wide flange beam bridges, Chester (Gassetts), Vt., to Truscon Steel Div., Republic Steel Corp., Boston; Miller Construction Co., Windsor, Vt., and Caledonia Sand & Gravel Co. Inc., St. Johnsbury, Vt., joint contractors.

100 tons, Mad River Dam, Winsted, Conn.; bids Apr. 18, U. S. Engineer, Providence, R. I.

Unstated, magazine storage, Eielson Air Base, Alaska; general contract to Moseley Construction Co., Fairbanks, Alaska, low at $484,755.

Unstated, Oregon State College dormitory, Corvallis, Oreg.; bids Apr. 11.

PLATES . . .

PLATES PLACED

760 tons, sheet piling for Pier 5, Port of Seattle, divided between Pacific Coast Div., Bethlehem Steel Co., and U. S. Steel Corp., Seattle.

258 tons, hull, carbon, military Industrial Supply Agency, Philadelphia, to South Asia Corp., New York.

165 tons, high tensile alloy, grade Hy-80, supply officer, Naval Shipyard, Portsmouth, N. H., to the U. S. Steel Corp., Pittsburgh.

150 tons, water barge to Richmond Steel Co., Richmond, Va., $82,293, and oil barge, to American Marine Corp., New Orleans, $87,646, through U. S. Engineer, Savannah, Ga.

124 tons, carbon, Military Industrial Supply Agency, Navy, Philadelphia, to U. S. Steel Corp., Pittsburgh; also, titanium alloy sheets, to Reactive Metals Inc., Niles, Ohio, at $115,567.

100 tons plus, water reservoir, King County District No. 79, Seattle, to Chicago Bridge & Iron Co., Seattle, at $101,470.

54 tons, H piling, Washington State, Cedar River bridge, to Pacific Coast Div., Bethlehem Steel Co., Seattle.

PLATES PENDING

1000 tons, two oil storage tanks, Deep Water Terminals, Brooklyn, N. Y.

870 tons, six tanks, Tidewater Oil Co., Providence, R. I.; bids in.

607 tons, high tensile, Grade Hy-80, delivery Mare Island Naval Shipyard, Vallejo, Calif.; also 413 tons additional reserved for labor surplus areas; bids to Navy Purchasing Office, Washington.

600 tons, three tanks, Socony-Mobil Oil Co. Inc., one each for erection at Elmira, Ogdensburg, and Plattsburg, N. Y.; bids closed Mar. 14.

125 tons, hull plates, Military Industrial Supply Agency, Philadelphia; bids Mar. 29; also, 33 tons of hull plates, second contract, same date, Grade M type 11.

110 tons, carbon hull plates, Military Industrial Supply Agency, Navy, Philadelphia; bids Mar. 27.

Advertising Index

Acipco Steel Products, Division of American Cast Iron Pipe Co. 2
Acme-Newport Steel Co. 196
Aetna-Standard Division, Blaw-Knox Co. 61
Ajax Magnethermic Corporation 3
Alan Wood Steel Co. 55
Allen-Bradley Co. 47, 48
Aluminium Limited Sales, Inc. 176, 177
American Cast Iron Pipe Co., Acipco Steel Products Division 2
Anaconda American Brass Co. 174
Armco Steel Corporation, Union Wire Rope .. 60
Armstrong-Blum Manufacturing Co. 105
Associated Spring Corporation 16

Babcock & Wilcox Co., The, Tubular Products Division ..... Inside Front Cover
Barnes, Wallace Co., Ltd. 16
Barnes, Wallace, Division, Associated Spring Corporation 16
Barnes, Wallace, Steel Division, Associated Spring Corporation 16
Bethlehem Steel Co. 1
B-G-R Division, Associated Spring Corporation 16
Binks Manufacturing Co. 37
Birdsboro Corporation 215
Bishop, J., & Co., Platinum Works, Tubular Products Division 46
Blaw-Knox Co., Aetna-Standard Division 61
Bliss & Laughlin 62
Boston Gear Works 106, 107
Buffalo Forge Co., Machine Tool Division .. 49
Bullard Co., The 217

Cincinnati Shaper Co., The 42
Cleveland Crane & Engineering Co., The, Steelweld Machinery Division 58
Colorado Fuel & Iron Corporation, The 24
Columbia-Geneva Steel Division, United States Steel Corporation 198
Commercial Shearing & Stamping Co. 8, 9
Cone-Drive Gears Division, Michigan Tool Co. 101
Continental Steel Corporation 180
Cooper-Bessemer 68, 69

Drever Co. 97
Dunbar Brothers Division, Associated Spring Corporation 16

Electric Controller & Mfg. Division, Square D Co. 171
Erie Foundry Co. 222

General Motors Corporation, Hyatt Bearings Division 86
General Steel Castings Corporation, National Roll & Foundry Division 43
Gibson Division, Associated Spring Corporation 16
Gisholt Machine Co. 65
Glidden Co., The, Industrial Paint Division .. 66
Goodyear Tire & Rubber Co., Inc., The, Industrial Products Division 12, 13
Great Lakes Screw Corporation 89
Gulf Oil Corporation 50, 51

Hamilton Foundry, Inc. 104
Heresite & Chemical Co. 99
Hill Acme Co., The 10
Horsburgh & Scott Co., The 195
Hyatt Bearings Division, General Motors Corporation 86

Inland Steel Co. 80

Jessop Steel Co. 59
Jones & Lamson Machine Co. .....25 thru 36
Jones & Lamson Machine Co., Machine Tool Division 100

Kaiser Aluminum & Chemical Sales, Inc., Kaiser Refractories & Chemicals Division 182, 183
Keystone Steel & Wire Co. 41
Kirk & Blum Manufacturing Co., The 220

Landis Tool Co. 14, 15
Lincoln Electric Co., The 102, 103
Lindberg Engineering Co. 111
Lodge & Shipley Co., The 200

Manross, F. N., & Sons Division, Associated Spring Corporation 16
Mesta Machine Co. ..... Back Cover
Michigan Tool Co., Cone-Drive Gears Division 101
Milwaukee Division, Associated Spring Corporation 16
Minnesota Mining & Manufacturing Co., Coated Abrasives Division 52
Mobil Oil Co. 56, 57
Morgan Construction Co. 173
Mundt, Charles, & Sons 6

National Roll & Foundry Division, General Steel Castings Corporation 43
National Steel Corporation, Weirton Steel Division 11
New Britain Machine Co., The, New Britain-Gridley Machine Division ..53, 54
Niagara Machine & Tool Works 79

Oakite Products, Inc. 194
Ohio Division, Associated Spring Corporation 16
Ohio Nut & Bolt Co., The 162
Ohio Steel Foundry Co., The 94
Olin Aluminum 112
Optical Gaging Products, Inc. 193
Osborn Manufacturing Co., The 181

Pacific Industrial Mfg. Co. 40
Pacific Press & Shear Corporation 40
Pangborn Corporation 201
Pittsburgh Steel Co. 108, 109

Raymond Manufacturing Division, Associated Spring Corporation 16
Republic Steel Corporation 38, 39
Roebling's, John A., Sons Division, The Colorado Fuel & Iron Corporation 24
Ryerson, Joseph T., & Son, Inc. 44, 45

Seaboard Pacific Division, Associated Spring Corporation 16
Shepard Niles Crane & Hoist Corporation .. 186
Simonds Gear & Mfg. Co., The 92
Simonds Saw & Steel Co. 7
Somers Brass Co., The 110
Square D Co., Electric Controller & Mfg. Division 171
Stuart, D. A., Oil Co., Ltd. 63, 64

Tennessee Coal & Iron Division, United States Steel Corporation 198
Texaco, Inc. 179
Thompson Wire Co. 161
Timken Roller Bearing Co., The, Steel & Tube Division 90
Tinnerman Products, Inc. 85
Torrington Co., The 21
Tubular Rivet & Stud Co. 190

Union Wire Rope, Armco Steel Corporation .. 60
United Engineering & Foundry Co. 189
United States Steel Corporation, Subsidiaries 198
United States Steel Export Co. 198

Valley Mould & Iron Corporation 70

Ward Steel Co. 93
Warner & Swasey 4
Weirton Steel, A Division of National Steel Corporation 11
Wheland Co., The 93
Wilson, Lee, Engineering Co., Inc. ..... Inside Back Cover

Youngstown Sheet & Tube Co., The 22, 23

Table of Contents, Page 19
Classified Advertising, Page 219

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April 3

IN

STEEL

Financial Analysis of the Steel Industry

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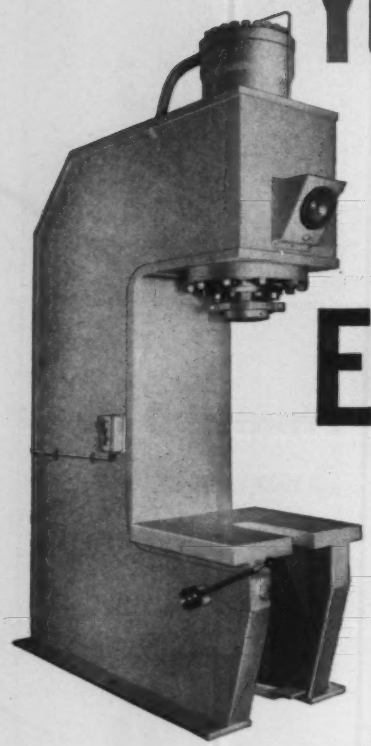

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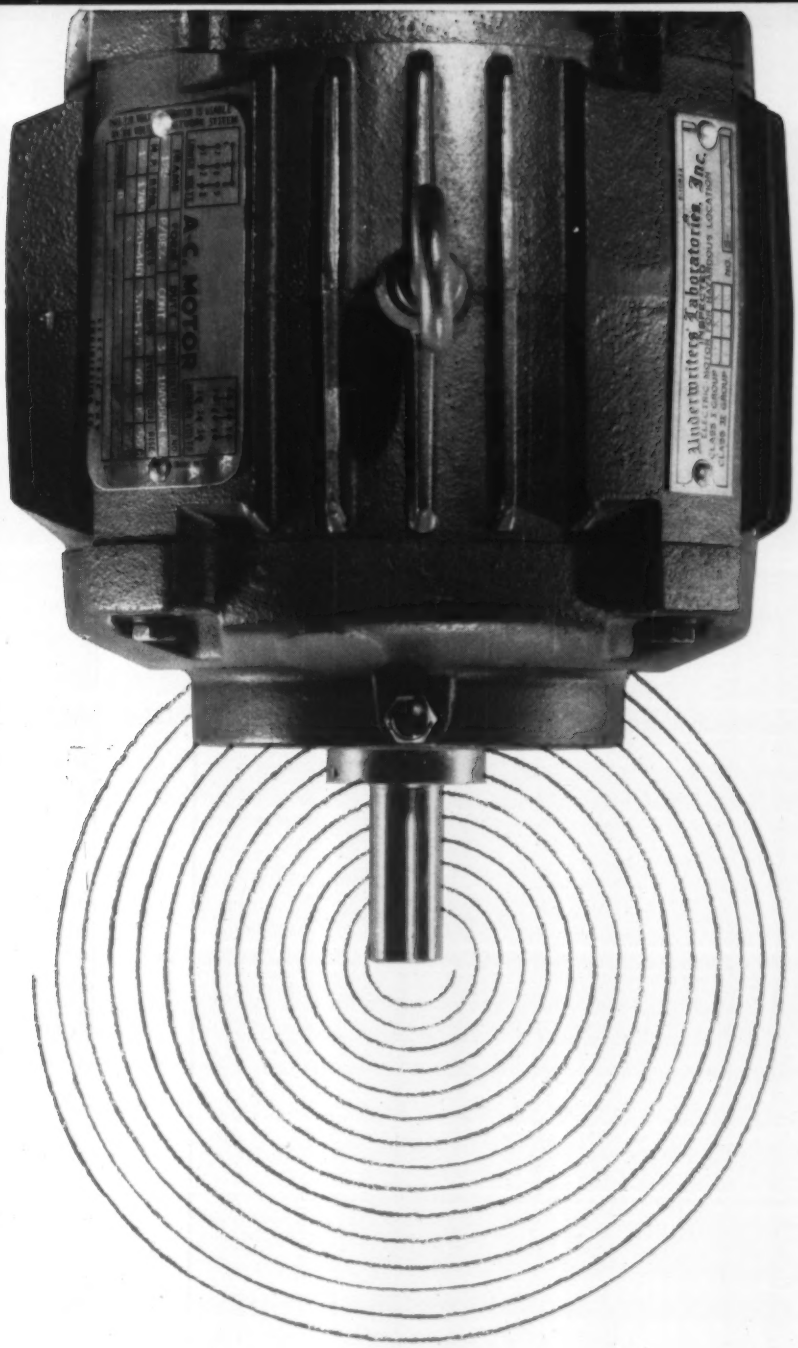

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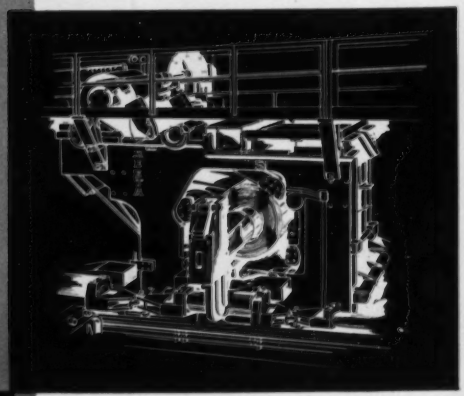

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